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ABSTRACT

To investigate the effects of stuttering therapy involving the avoidance reduction - anxiety reduction approach, a study was conducted with 16 adult stutters who received group and individual therapy for two evenings a week for nine months. Evaluations were made nine months prior to therapy, at the beginning and end of therapy, and nine months after the close of the treatment. Results indicated that the more severe stutterers showed improvement during therapy but regressed slightly during the followup period, while those subjects with a less severe handicap maintained their improvement during the followup period. Since the progress of the subjects was not statistically significant, it was concluded that modifications of the therapy program were necessary for more effective and lasting results. The various testing devices revealed certain changes in areas of personality and attitudes, but showed no change in speech associated anxiety. (RD)

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FINAL REPORT
Research and Demonstration Project 1725-S
Social and Rehabilitation Service
U.S. Department of Health, Education, and Welfare

# AN ASSESSMENT OF THE RESULTS OF STUTTERING THERAPY

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EC 030 104E

## SIGNIFICANT FINDINGS FOR REHABILITATION WORKERS

The evaluation of this therapy program for adult stutterers indicates that stuttering speech behavior is being reduced substantially during therapy but with somewhat greater success in more severe stutterers than in less severe stutterers.

Both the analysis of the results for the sample as a whole and observation of the outcome taking severity into consideration indicate that a longer term of treatment (perhaps twice as long as the nine month period in this study) including a more gradual termination of therapy would improve results. Present information suggests that stuttering therapy for adults is a long term process regardless of severity. It may be that therapy for adult stutterers is often terminated after considerable progress has occurred, but at a time when patterns of change are not firmly conditioned or generalized. This points up the importance of such an approach as graduating adult stutterers to a carry-over or terminal group after the most significant aspects of therapy have been covered successfully. In addition, greater attention needs to be given to the planning of situations which bring about a greater generalization of behavior acquired in the clinic to outside, real life situations.

Findings, especially those for less severe stutterers, imply that the therapy program described and evaluated in this investigation may not be the most appropriate. The present results suggest that along with work on attitudes and the diminishing of fear and avoidance behavior, a greater emphasis on building up new psychomotor speech patterns using delayed auditory feedback and other approaches to motor speech planning should be studied. It is also recommended that therapeutic techniques relating to all of the goals of therapy can be made more effective by programming activities more precisely than was done in this therapy program. It may be that increased efficiency can offset, in part at least, some of the need for therapy to be as long term as recommended previously.

Adult stutterers tend to evaluate their own progress in therapy as more meaningful and beneficial than a more objective procedure such as the ratings of tape recordings may show. Both procedures provide information that is valuable in assessing progress.

Speech improvement in adult stutterers is likely to be accompanied by personality changes such as becoming less self-debasing (self-effacing and timid) and less in need of succorance (aid, help, and assistance). In addition, a change toward more orderliness of general functioning appears to accompany speech improvement. Certain positive changes in personality such as decreased depression, phobic behavior, worry, and social withdrawal seem to begin with the expectation of help and continue during therapy.

Stuttering behavior can be modified without changing a substantial number of the personality characteristics sampled in this study. Some may contend that more emphasis on personality change would make stuttering therapy more effective. In terms of the point of view that stuttering is a symptom of personal maladjustment, it is interesting to note that there were no instances in which the stuttering therapy produced a group change toward poorer adjustment.

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# AN ASSESSMENT OF THE RESULTS
# OF
# STUTTERING THERAPY

Research Project Directed
By

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September 30, 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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This investigation was supported, in part, by Research Grant 1725-S from the Division of Research and Demonstration Grants, Social and Rehabilitation Service, Department of Health, Education, and Welfare, Washington, D.C. 20201.

# PREFACE

Beginning in the 1950's there was considerable interest in research studies assessing the process and outcome of psychotherapy. My interest was particularly stimulated by the book, Psychotherapy and Personality Change, edited by Carl Rogers and Rosilind Dymond in 1954, describing a series of studies evaluating client-centered psychotherapy. I knew that we had very little information of this kind about stuttering therapy, and I shared the concern of many clinicians about the effectiveness of the treatment of stutterers.

When I returned to Northwestern University in 1962, my responsibilities with the Adult Stuttering Program revived a previous interest in studying the results of stuttering therapy. I had first considered an investigation of this type for my doctoral dissertation, but had recognized the difficulties involved in doing such a study in the length of time available to complete a doctorate degree.

With the support of my departmental chairman, David Rutherford, Alfred Slicer, Director of Vocational Rehabilitation in Illinois, and George Yacorzynski, head of the Division of Psychology, Northwestern Medical School, the present investigation was designed and a research and demonstration grant received from the Rehabilitation Services Administration, U.S. Department of Health, Education, and Welfare.

I am grateful to those individuals mentioned above. I feel a special debt to the Dean of the School of Speech, James H. McBurney and Harold Westlake, Professor of Speech Pathology, for the ways in which they facilitated this work by providing professional advice and administrative guidance.

Jack Arbit, Associate Professor of Psychology, Northwestern Medical School, provided many hours of consultation during the three years the project has been underway.

In the planning of the study I invited the participation of the following consultants:

George Shames, Ph.D. -- Director of Speech and Hearing Center, Professor of Speech Pathology, University of Pittsburg.
Joseph Sheehan, Ph.D. -- Professor of Psychology, University of California, Los Angeles.
Dean Williams, Ph.D. -- Professor of Speech Pathology, University of Iowa.

Their penetrating criticisms and insightful suggestions helped to improve the investigation, but they should not be held accountable in any way for the conduct of the research.

Those who served as clinicians were:

Carol Adler
Lenore Blum
Joan Houston
Marlene Karki
Mary Lehman
Patricia McLean
Carol Stover
Gay Treger

Allen Sorkin, Associate Professor of Psychology, Northwestern Medical School, and a specialist in statistical analysis, became a consultant shortly after the research was underway. His assistance and guidance in organizing and analyzing the data is greatly appreciated.

Larry Sant served as a research assistant for two years. His volume of work and assistance is acknowledged with pleasure. Carol Murphy, an undergraduate student, has served as typist during the preparation of this final report.

I would like to thank those people with the problem of stuttering, including those who were clients in the therapy program studied and reported here, for their interest in helping us to gain a better understanding of our task in helping those handicapped by stuttering.

Evanston, Illinois
September, 1969

H. H. G.

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# ABSTRACT

The purpose of this study was to assess the results of stuttering therapy for adults when a carefully delineated approach was utilized. In addition to an evaluation of changes in stuttering behavior per se, changes in several psychological, behavioral, and physiological characteristics were investigated. Another purpose was to evaluate the therapy group after a follow up period to measure the degree to which changes occurring in therapy were maintained. The approach to stuttering therapy employed in the investigation was essentially an avoidance reduction, anxiety reduction therapy system, based principally on concepts of learning theory psychology which have been described over the years by Bryngelson (1950), Johnson (1956), Sheehan (1958), and Van Riper (1963). The subjects received group and individual therapy two evenings a week for nine months. A research design was used in which the subjects served as their own controls. Evaluations and measurements of the therapy groups were made nine months before therapy began, again at the end of this "waiting period" before therapy was initiated, at the end of the therapy period, and nine months after the close of therapy. For the purpose of data analysis and the reporting of results the total number of subjects were pooled and then divided into a more severe group (Group I, N=8) and a less severe group (Group II, N=8).

Viewing all sixteen subjects as one group, there was a substantial and statistically significant reduction in stuttering during the therapy period. Taking severity into consideration, Group I (more severe) showed a significant improvement during therapy but regressed slightly during the follow up period. Group II (less severe) improved during therapy and continued to improve during the follow up period; however, the change never reached statistical significance. It was concluded that certain changes should be instituted to make therapy more effective (especially for less severe stutterers) and to insure longer lasting results. The subjects' responses to self-report procedures revealed significant decreases in avoidance behavior and stuttering, significant increases in the enjoyment of speaking, and significant improvement in attitudes toward stuttering as results of therapy. These results were not related differentially to stuttering severity. Based on these findings, it was concluded that the less severe group evaluated their progress in therapy as meaningful even though the rated changes in speech behavior -- while showing a trend toward improvement -- were not significant.

Data from the Edwards Personal Preference Schedule (EPPS) revealed statistically significant decreases during therapy on the succorance and abasement variables for the stutterers as one group (N=16) and a significant increase on the order variable in the more severe group. On the Minnesota Multiphasic Personality Inventory (MMPI) there were statistically significant decreases on the depression, psychasthenia, and social isolation scales. The change in depression was significant for the less severe group only. All of these positive changes on the MMPI began during the waiting period and continued during therapy. Thus, therapy did bring about changes in several dimensions of personality, but apparently, expectation of help can be a strong factor in beginning the process of change. Also, stuttering can be modified and in some instances a statistically significant amount, without changing a substantial number of the personality traits measured by the EPPS and the MMPI. The findings from the Holtzman Inkblot Technique were interpreted as having little or no significant meaning.

The program of stuttering therapy did not bring about a change in specific speech associated anxiety as measured by palmar sweat prints or general anxiety as measured by the Taylor Manifest Anxiety Scale.

# CHAPTER I

# INTRODUCTION

Advances in research and resulting theory pertaining to the etiology, development, and maintenance of the stuttering problem have contributed to what Bloodstein (1959) has described as a "firm basis for qualified optimism about the results of therapy with stutterers" (p.65). However, during the last fifteen years, speech pathologists have increasingly made references to the need for studies of the process and outcome of speech therapy including therapy for stutterers. Concomitantly, since World War II, psychologists have manifested more and more interest in research design and methodology for the evaluation of psychotherapy (Strupp and Luborsky, 1962). In a special report on "Research Needs in Speech Pathology" published in 1959, Brown, Sheehan, West and Wischner offered the following statement in commenting on research needs in stuttering:

> Although the committee clearly recognizes the difficulties inherent in research designed to evaluate clinical techniques and programs for stutterers, it regards the need for such research as urgent. (p.29)

## Purpose of the Project

The aim of this project was to investigate certain changes associated with the therapeutic process when a carefully described approach to stuttering therapy was carried out with a group of adult stutterers. In addition to an evaluation of the change in stuttering behavior per se, changes in several other psychological, behavioral, and physiological characteristics were studied. An objective was to be able to make statements about these changes such as, "This type of stuttering therapy brings about changes in variables A and B, but not in C and D. If C and D are considered important, the therapy should be modified to bring about these changes." A related purpose was to obtain information about therapy changes as related to certain subject variables.

Another purpose of the study was to evaluate the therapy group after a follow-up period to measure the degree to which changes occurring in therapy were maintained or continued. Moreover, studying the dimensions of change in terms of variables related to hypotheses associated with the stutterers' problems was expected to add to our understanding of the disorder.

Finally, the project was expected to be a contribution by demonstrating a research design and methodology for the assessment of the effectiveness of stuttering therapy. Through each of these contributions the project director hoped to add to our understanding of rehabilitation procedures for socially and vocationally handicapped stutterers.

Review of Relevant Literature

Van Riper has provided some valuable descriptive information on the process, outcome, and follow-up of stuttering therapy in his Chapter "Experiments in Stuttering Therapy," in Stuttering: A Symposium (1958). He stated:

> This is a tale of one man's experiences in stuttering therapy, in which he deliberately varied his procedures, recorded by means of daily and weekly protocols his goals and methods, and evaluated the progress of his cases as objectively as he knew how. (p. 275-276)

Earlier, Shames (1952) undertook a study to investigate the value of certain biographical and personality information in predicting success in speech therapy. In this study of 37 subjects with 4 different types of speech problems, the criterion to evaluate speech therapy dealt with the degree of alteration of the symptoms of speech inadequacy (paired comparisons of pre- and post-therapy recordings) and social inadequecy (Rorschach Test, Factor S. Guilford-Martin Inventory of Factors STDCR, and clinical ratings of social avoidance). Forty variables were examined for their prognostic value for speech therapy. Nine of these were of a biographical nature and the remaining 31 were obtained from pre-therapy rating scales, questionnaires, and psychological tests. Shames was careful in the reporting of this study to emphasize its exploratory nature and its rather serious limitations. The number of variables having a statistically significant relationship with success was less than the number expected by chance. He urged that larger samples of one type of speech disorder be studied using a standardized therapeutic climate.

Shames (1953) extended this investigation to study the relationship between group homogeneity and success in speech therapy. Using the same four criteria of success as previously mentioned, he found that 18 of 24 group dimensions showed less variability in the "most" successful group. These findings were significant at the .01 level of significance. Based on these results, Shames suggested that subjects in therapy who are more alike in age, education, socio-economic level, type of speech problem and types of social and psychological difficulties will attain, on the average, greater success than a less homogeneous group. Again, he pointed out that research in the areas of measurement of success, prognosis, and change in therapy was in its very early exploratory stages.

Sheehan (1954) evaluated the use of the Rorschach as a prognostic tool in the treatment of stuttering. Rorschach records of 35 stutterers were rated on the prognostic scale developed by Klopfer. Predictions from the Klopfer scale were compared with therapeutic outcome as reflected in those who continued or dropped out and those who improved more or less as measured by therapists' ratings of speech behavior and personality. Using this approach, stutterers were found to be good treatment prospects. Rorschach factors were found useful in predicting psychotherapeutic improvement, but could not be used to predict speech or symptomatic improvement.

Williams and Kent (1959) studied the effect of meprobamate during therapy as a helpful adjunct to stuttering therapy. They hypothesized that the administration of meprobamate to stutterers in therapy would bring about a reduction in anxiety and thus facilitate changes in speech behavior. Fifteen adult stutterers were divided into a control group of seven and an experimental group of eight on the basis of sex, amount of previous therapy, severity ratings, and MMPI profiles. For a period of 99 days meprobamate was administered to the experimental group and a placebo to the control group. Changes in speech behavior before and after therapy were evaluated using a severity rating scale and by counting the number of stutterings. These investigators concluded that there was no significant difference in change in speech behavior between the control and experimental group.

## Description of the Therapy Program

The approach to stuttering therapy employed in this investigation was essentially the avoidance reduction, anxiety reduction therapy system, based principally on concepts of learning theory psychology, which have been described over the years by Bryngelson (1950), Johnson (1956), Sheehan (1958), and Van Riper (1963). Although these clinicians have differed in the emphasis given to certain procedures, all have recommended therapeutic activities aimed toward the following goals: (1) diminishing the fear and avoidance behavior associated with speaking, (2) changing the perception, attitudes, and feelings of the stutterer, (3) building up new psychomotor speech patterns and patterns of behavior generally as maladaptive speech responses and attitudes are weakened. Activities representing these three areas of therapeutic endeavor encompassed most of the work done in the stuttering program which was evaluated in this investigation. Relaxation procedures, not emphasized by Bryngelson, Johnson, Sheehan, and Van Riper, but which this investigator (Gregory 1968) has felt are a beneficial aspect of the total program of therapy for adult stutterers, were utilized. Thus, to the three goals of therapy enumerated above, a fourth, diminishing excessive bodily tension, was added.

In thinking of stuttering therapy, these four goals or areas of therapeutic activity are viewed as inter-related (Gregory 1968). Briefly, as the stutterer is able to express or exhibit his stuttering through voluntary stuttering or cancellation, for example, he is testing a new attitude toward dysfluent speech as well as diminishing the fear he has learned to have of stuttering. At the same time if some change in personal adjustment is occuring as a result of insight gained throught a program of self-study, general anxiety may be reduced along with the reduction of specific speech anxiety.

He may be able to diminish speech associated tension as a result of specific relaxation exercises using the progressive relaxation approach; and at the same time, the reduction of fear associated with speaking and better self-understanding and acceptance may reduce self-defensive tension-evoking anxiety. Finally, as a result of these changes he may be able able to be more effective in altering his speech pattern.

In working with groups of stutterers the present investigator has given considerable attention to the facilitation of the generalization of altered attitudes, altered general social responses, and altered speech responses to outside life, i.e. to real life (Gregory 1961, 1964, 1968). Beginning early in therapy, the group sessions were open to members of the stutterer's family and his friends, as well as other interested persons who wished to attend. Everyone present was encouraged to participate in the group discussion which explored the nature of the stuttering problem. In addition, they were asked to take part in the acting out and the rehearsing of speaking situations and social hours. Furthermore, everyone present, client, clinician, and visitor was encouraged to say whatever he wished. The emphasis was on realism. This type of an "open clinic" approach in the group was used to facilitate the generalization, or transfer of altered attitudes, speech responses and social responses to persons and situations outside the clinic.

The following is an outline indicating some of the specific procedures which were utilized. The earlier comment that it is difficult to restrict a technique's usefulness in terms of any one goal of therapy is to be recalled at this point.

A. Diminishing the fear and avoidance behavior associated with speaking.

(1) Mirror work
(2) Use of tape recorder
(3) Negative practice
(4) Cancellations, pull-outs, preparatory sets
(5) Voluntary stuttering
(6) Delayed responses
(7) Reward for studying stuttering behavior
(8) Therapist sharing of stutterer's problem by learning client's stuttering pattern and using voluntary stuttering with him.

B. Changing perceptions, attitudes, and feelings.

(1) Information about stuttering
(2) Labelling and describing behavior
(3) Exploration of adjustment mechanisms, projection, etc.
(4) Self-study, exploration of assits, liabilities, potenialities, etc.
(5) Sharing of feelings and experiences
(6) Bibliotherapy
(7) Talking to auditors about stuttering

(8) Listing and studying difficult situations
(9) Analysis of role playing situations
(10) Entering difficult situations to study behavior and try new responses

C. Building up new psychomotor speech patterns and patterns of behavior.

(1) Use of new preparatory sets in speaking
(2) Role playing
(3) Field trips
(4) Entering difficult situations progressing from easiest to more difficult
(5) Variation in rate, phrasing, inflection, etc., in speech
(6) Public speaking, discussions, etc.

D. Instruction in progressive and differential muscle relaxation (Jacobsen 1938, Wolpe 1958)

(1) Systematic tensing and relaxing of the muscles in one part of the body at a time, beginning at the feet and working upward to the head.
(2) Attention to the sensory awareness of the intermediate graditions of muscle tone.
(3) Conditioning of verbal cues (client was told to talk to himself, give himself verbal instructions) as he experienced changes in the tension of various areas of the body.
(4) Generalization of more relaxed bodily state from time of exercise to time when stutterer is speaking.
(5) Transferring relaxed bodily state to specific muscle groups involved in speech act, i.e. muscles of the larynx or jaw.
(6) Thinking of and striving for relaxation when under stress (Reciprocal inhibition, see Wolpe 1958).

The subjects were seen two evenings a week for therapy consisting of a one hour individual session and a one hour group session each evening.

# CHAPTER II

## METHODOLOGY

### General Design of the Study

A research design was used in which the subjects served as their own controls. Evaluations and measurements of the therapy groups were made nine months before therapy began, again at the end of this "waiting period" before therapy was initiated, at the end of the therapy period, and nine months after the close of therapy. The design is sketched below:

| Pre-Wait Testing | | Pre-Therapy Testing | | Post-Therapy Testing | | Follow Up Testing |
|---|---|---|---|---|---|---|
| | Waiting Period<br>9 months | | Therapy Period<br>9 months | | Follow Up Period<br>9 months | |

This procedure of "own controls" appeared to be the most satisfactory method of meeting the tremendous problem of equating "control" and "experimental" groups. In this manner we have an indication of the way in which changes occurred in subjects during a period before the experimental variables of therapy were introduced. Thus, change which occurred during the therapy period was compared with that taking place during the "waiting period." If the change which occurred during therapy was significantly greater than that occurring during the "waiting period," it was reasoned that it could be concluded that therapy produced changes which could not be accounted for otherwise. In addition, the change during the follow up period could be compared to that taking place previously.

In this type of design the possibility that one taking of a test may alone affect the manner of responding to that test on succeeding occasions had to be considered. Possibly this problem could not be fully resolved, but Lana (1959) at the University of Maryland had carried out a study to test the effects of a pre-test questionnaire and concluded that a pre-test did not necessarily sensitize an individual so that his reactions to a second testing was differentially affected.

## Selection of the Subjects

Seventeen adult stutterers constituted the experimental group. It was originally planned to have two groups of ten subjects each, but three subjects dropped out of the program during the waiting period or just after therapy began. Consequently, one group contained seven subjects and the other nine.

The twenty original subjects were taken in order as they appeared on the waiting list for the Adult Stuttering Program at the Northwestern University Speech Clinic. There was a preliminary interview with each prospective subject in which he was given the opportunity to participate in the program. A general description of the plan of therapy was given, i.e. the pre-waiting period testing, etc. was explained. He was told that he would receive the same therapy which the Speech Clinic had found to be best; that we were not experimenting with types of therapy, and that all aspects of the program would be kept confidential. In addition, the subjects interviewed were given the choice of going into this program, remaining on the waiting list for the regular Adult Stuttering Program, or being referred to another source of therapy. No one was accepted who had been in therapy for his stuttering during the previous five years. The Wechsler Adult Intelligence Test was administered to all of the subjects. Any subject about whom the investigator had doubt that his intellectual operating level was average or above was not accepted until he had been given the intelligence test.

All of the preliminary interviews were conducted by the major investigator. He made a judgment as to whether or not the person had a speech difficulty of the type which is commonly categorized as stuttering. In making this judgment the interviewer looked for what Johnson (1956) and Van Riper (1963) appear to agree characterizes stuttering in an adult, abnormal disruptions in the rhythmic flow of speech and avoidance behavior. Johnson states:

> There are two major aspects of stuttering; there are the movements or activities which the speaker performs in being non-fluent or hesitant, and there are the feelings or attitudes or motivations --- and conflicts among them --- with which he anticipates, performs, and remembers these activities. (p. 215-16)

Van Riper says:

> Stuttering occurs when the flow of speech is interrupted abnormally by repetitions or prolongations of a sound or syllable or posture, or by avoidance and struggle reactions. (p. 311)

## Selection of the Therapists

The major investigator served as the leader of the group therapy sessions. At the time, he had ten years of experience conducting group and individual therapy programs for adult stutterers. The seven speech therapists who served as therapists for the individual therapy and participated actively in the group process had Master's Degrees in Speech Pathology earned at Northwestern. Each studied with the major investigator and had been a therapist in the Stuttering Program at the Northwestern University Speech Clinic.

## Variables Investigated; Rationale, Hypotheses, and Method of Evaluation

As Rogers (1954) has stated in his discussion of research studies in the client-centered approach to psychotherapy, the value judgment in determining the criteria of improvement or success in therapy makes it difficult to define "success." It might possibly be contended that the stuttering behavior itself, by virtue of its availability and quantifiability, provides a satisfactory criterion of improvement; however, it is usually emphasized that procedures for evaluating the stutterer's problem and therapeutic change should also provide a means of assessing the attitudes, feelings, and social behavior of the person. Therefore, rather than begin with the definition of certain criteria of success, e.g. diminished stuttering behavior, improved attitude toward stuttering, and less avoidance behavior as operationally defined and measured, the objective of the investigation was to study the changes in a group of variables, operationally described, as affected by an approach to therapy which was precisely delineated.

In this section each of these variables will be described and discussed with reference to the purpose of the study.

The Stuttering Behavior - Obviously, the stuttering behavior itself is one dimension that was expected to change during therapy. Therapeutic activities relating to the four goals of therapy presented in a previous section were aimed in one way or another toward the goal of diminished stuttering. Therefore, it was clearly hypothesized that there would be a change in stuttering behavior as a result of therapy.

Measuring the degree of stuttering with reference to either frequency or severity, or in terms of both of these measures, has received considerable research attention during recent years (Johnson et al, 1963). Research has confirmed the clinical observation that the amount and severity of stuttering in oral reading and speaking for a particular stutterer may differ rather widely ( Sander, 1961). Consequently, measurements of stuttering speech behavior were made for both speaking and reading. This also took into consideration the desire of most stutterers to improve their communication in both oral reading and speaking. The procedures used in the speaking and reading tasks are described below.

(1) Reading the passage, "Your Rate of Oral Reading," to one listener.
(2) Reading the same passage to five listeners either 24 hours later or 24 hours before the reading to one person (Tasks one and two were counterbalanced).
(3) Speaking to one listener using the Job Task (Johnson et al, 1963)

in which the stutterer is asked to talk for three minutes or so about his "preferred, or possible future job or vocation." The directions for Job Task as described by Johnson were followed carefully.

(4) Speaking to an audience of five listeners either 24 hours later or 24 hours before the speaking to one person (Tasks 3 and 4 were counterbalanced) using the Job Task.

The subjects were given the opportunity to read the passage one day before the first test reading to reduce the effects of total unfamiliarity with the passage during the first reading. They were given the Job Task one day before also to reduce the effect which dealing with a new area of thought might have on the first Job Task discourse.

Different listeners were used for repeated measurements. The listeners were instructed carefully to behave in a standardized manner in the testing situation (See instructions to subjects and listeners in Appendix II).

Tape recordings were made of the reading and speaking situations. For each speaking and reading task, two 30 second samples were extracted randomly. All of the tape segments for each therapy group over the entire time of the study (four test sessions) for reading or speaking separately were placed in a random order on a tape for rating. To clarify, the following four tapes were prepared for rating.

Therapy Group I, Reading segments
Therapy Group II, Reading segments
Therapy Group I, Speaking segments
Therapy Group II, Speaking segments

The ratings were done under the direction of Martin Young, Ph.D.[1] using equipment especially developed for this purpose. Four different panels of observers (12 for Therapy Group I reading segments, 13 for Therapy Group II reading segments, 11 for Therapy Group I speaking segments, and 13 for Therapy Group II speaking segments) scaled the severity of stuttering of each of the samples on a nine-point equal-appearing interval scale of stuttering severity. Each group of observers heard previously selected anchor samples, i.e. samples selected to represent the first and last categories, to familiarize them with the tasks. The observers recorded their ratings by means of instrumentation described by Young (1969). Young has shown that the Rating Analyzer produces individual ratings and scale values that show reliability comparable to previous research employing equal-appearing interval scaling of stuttering severity.

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[1] At the time that the grant was made supporting the study of therapy being reported here, Dr. Young received a grant (RD 1721) to support the study and development of the equipment which was subsequently used to rate the speech samples in this investigation. Dr. Gregory and Dr. Young worked cooperatively as was suggested by the review panel which approved the two grants.

Specific Speech Anxiety - There has been a great deal of research concerning the relationship between the anticipation of stuttering, the resulting anxiety, and stuttering behavior (Johnson 1955). Johnson has stated that stuttering is an avoidance reaction which is conditioned to the cues of stimuli associated with its occurrance. He comments:

> The expectation of stuttering is apprehensive, characterized by anxiety in some degree, ranging from near panic to the very mild sort of affective reaction which the stutterer expresses by saying simply that he would rather not stutter. This anxious or apprehensive expectation comes to be associated with and to be elicited by the sounds, words, and listeners... to which stuttering has been experienced in the past. (p. 23)

Almost all professional clinicians acknowledge the involvement of fear as one of the key problems in stuttering behavior and stuttering therapy. One of the goals of the therapy program investigated was the reduction of fear and avoidance behavior associated with the act of speaking. Bryngelson, Johnson, Sheehan, and Van Riper all emphasize the goal of anxiety "deconfirmation," "reduction," "mastery," etc. Consequently, a second hypothesis of this investigation was that there would be a change in specific speech associated anxiety as a result of therapy.

The Palmar-Sweat Index (PSI) has been used and described recently as a reliable measure of speech-related "anxiety" or "arousal" (Haywood, 1963, Brutten, 1963b). Brutten (1963a) has shown that dysfluency adaptation of stutterers is associated with a covarying decrease in palmar sweat scores. Previously, this technique of measuring palmar sweating has been used by Mowrer and his associates (Mowrer 1953) at the University of Illinois to assess the changes in tension of patients undergoing psychotherapy and to study the effects of certain types of situational stimulation. Mowrer et al expressed optimism about the plamar sweat index as a physiological indicator of emotion. They pointed out, that unlike some other physiological indicators of emotion, palmar sweating could occur "quite profusely, without necessarily disturbing the organism's homeostatic equilibrium" (Mowrer 1953, p. 627). Several other studies (Brutten, 1963b) tended to validate the Palmar-Sweat Index as an indicator of emotional arousal or anxiety when subjects responded to situations prejudged to be emotional and stressful.

In this investigation palmar sweat measures during silence, anticipation of reading and reading were obtained using the commercially procuced Lab-Line SIU Sudorimeter. This equipment includes a Printer, which permits palmar sweat on the finger tip to be permanently recorded on chemically treated film; a Punch for making locator holes on the film and a Densitometer, for measuring the degree of palmar sweat photometrically.

The following instructions to the subject describe the way in which prints were made during a silent adaptation period, a period of anticipating reading, while reading, and following a period of reading.

The examiner said: "To perform this task, a solution will be placed on one of your fingertips and allowed to dry. You will place that fingertip in the well on top of the printer. The fingertip should rest against the stop at the bottom of the well. Your hand should rest comfortably on the top surface of the printer with the remaining fingers extended. The switch will be pressed and you will feel a plate come up against your fingertip. After 30 seconds, the plate is released, at which time you will remove your finger from the printer."

Condition I The examiner said: "Now, we will perform a practice trial. Place this (pointing to the appropriate finger) finger in the well. Make sure that the tip of the finger is on the stop at the bottom of the well and that the top surface of the finger is forward in the well."
The experimenter checked to see that the finger was in the correct position. Then the activator button was pushed.

Condition 2 The examiner painted the appropriate finger. The subject placed his finger in the well. At the end of 30 seconds a print was made.

Condition 3 At this point, the examiner left the room, brought in three listeners, and introduced them to the subject. He gave the subject a copy of the passage "Your Rate of Oral Reading." (Johnson et al 1963)
The examiner said: "In a minute or so, I would like you to read this passage to these people. I will tell you when you may begin."
At the end of 30 seconds, the examiner painted the appropriate finger and had the subject place it in the well. At the end of 30 seconds, a print was made.

Condition 4 The examiner said: "Now I will paint your finger and place it in the well while you read. Just continue without interruption. In reading the passage, read as you ordinarily would." The subject held the passage in the hand opposite the one to be used.
After the subject reached the line "The best method in...," the examiner painted the finger and had the subject place his finger in the well. At the end of 30 seconds a print was made.

Condition 5 After the subject finished reading, the examiner said: "I want you to relax, get comfortable in your chair, and sit quietly for three minutes."
At the end of two minutes, the examiner painted the appropriate finger. At the end of 30 seconds a print was made.

General Anxiety - The hypothesis presented in the previous section was concerned with situational anxiety. Clinicians and researchers have also been interested in the degree of general or chronic anxiety in stutterers. Diverse results have characterized the research studies pertaining to the personality adjustment of adult stutterers, but most reviewers of the literature in this area, while not finding a particular personality pattern characteristic of stutterers, report that stutterers appear to be somewhat more anxious, tense, uneasy and withdrawn (Johnson 1956, Goodstein 1958).

Santosefano (1960) in his study of anxiety and hostility in stuttering has stated:

> The assumption was accordingly made that stuttering and being a stutterer places an individual in a fairly constant state of stress because of actual and continually imminent negative reactions by the environment and because of the stutterer's own evaluation and interpretation of the handicap in terms of his self-esteem, security, and identity. It was hypothesized that this state of stress, under which the stutterer functions ultimately results in predominant and enduring states of anxiety and hostility. (p. 339)

A third hypothesis of this study was that therapy would result in a change in general anxiety as measured by the Taylor Manifest Anxiety Scale. As the name implies, the Taylor scale measures the more clearly felt anxiety.

Personality - In addition to the general anxiety factor, speech pathologists have been interested in other aspects of the stutterer's personality. Reviews of the literature (Johnson 1956, Goodstein 1958) reveal that a large number of the self-report and projective techniques have been used to evaluate stutterers and to compare stutterers with non-stutterers. As pointed out in the previous section, the findings of these research studies have not been in agreement. However, the concensus of opinion appears to be that stutterers do not have a particular personality pattern resembling severely maladjusted persons. On the other hand, reviews of the literature, as mentioned in the preceding discussion on general anxiety, do indicate that adult stutterers have adjustment problems which have to be considered in a program of rehabilitation.

Consequently, a fourth hypothesis of this investigation of changes which occur in stuttering therapy was that there would be changes in certain phases of the stutterer's personality characteristics. To evaluate personality dynamics, the projections of the stutterers were obtained using the Holtzman Inkblot Technique and two self report tests, the Minnesota Multiphasic Personality Inventory and the Edwards Personal Preference Schedule.

The materials for the Holtzman technique include 45 inkblots which are scored on the basis of the subject's response to each card. It was decided to use this procedure instead of the Rorschach Test, since the Holtzman appears to provide the necessary conditions for the individual study of personality functioning, but in addition, its structure (mainly limiting productivity to one response to each of 45 cards) makes it more amenable to statistical use. Holtzman (1961) has described 22 variables and provided detatiled instructions for scoring. The following is a listing of each variable and abbreviation.

| Variable | Abbreviation |
|---|---|
| Reaction Time | RT |
| Rejection | R |
| Location | L |
| Space | S |
| Form Definiteness | FD |
| Form Appropriateness | FA |
| Color | C |
| Shading | Sh |
| Movement | M |
| Pathogmomic Verbalization | V |
| Integration | I |
| Human | H |
| Animal | A |
| Anatomy | At |
| Sex | Sx |
| Abstract | Ab |
| Anxiety | Ax |
| Hostility | Hs |
| Barrier | Br |
| Penetration | Pn |
| Balance | B |
| Popular | P |

The Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley, 1951) was used to sample traits of personality considered more abnormal such as hypochondrias and depression. This inventory has been designed to measure adjustment as it might be related to severe pathological categories. In contrast, the Edwards Personal Preference Schedule (EPPS) (Edwards, 1959) has been standardized with "normal" adult samples and the variables measured such as autonomy, endurance, and aggressiveness deal to a greater degree with characteristics within the normal range of a person's adjustment. Since studies of stutterers have indicated that they do not, as a group, present personality patterns resembling more severe maladjustment, it was thought that changes in personality of the type which may occur in the therapy program would be more likely to be demonstrated on the EPPS. At least one other advantage which enterred into the decision to administer the EPPS, in addition to the MMPI, was that it is constructed in such a way that the individual must choose from two statements in terms of which one is more characteristic of him -- these statements being paired in such a way as to eliminate the possibility of answering solely in terms of the social desirability of an item.

The following is a list of the MMPI scales and the abbreviations employed.

| Variable | Abbreviation |
|---|---|
| Lie Score | L |
| Validity Score | F |
| K Score | K |
| Hypochondriasis Scale | Hs |
| Depression Scale | D |
| Hysteria Scale | Hy |
| Psychopathic Deviate Scale | Pd |
| Interest Scale | Mf |
| Paranoia Scale | Pa |
| Psychasthenia Scale | Pt |
| Schizophrenia Scale | Sc |
| Hypomania Scale | Ma |
| Social I.E. Scale | Si |

Listed below are the EPPS scales and the abbreviations utilized.

| Variable | Abbreviation |
|---|---|
| Achievement | ACH |
| Deference | DEF |
| Order | ORD |
| Exhibition | EXH |
| Autonomy | AUT |
| Affiliation | AFF |
| Intraception | INT |
| Succorance | SUC |
| Dominance | DOM |
| Abasement | ABA |
| Nurturance | NUR |
| Change | CHG |
| Endurance | END |
| Heterosexuality | HET |
| Aggression | AGG |

Avoidance Behavior - Stutterers develop fears of certain speaking situations and these fears have the effect of motivating them to avoid these situations. The anticipatory factor in stuttering is pertinent to this consideration of the avoidance behavior of stutterers. Stutterers come to anticipate difficulty in certain situations; therefore, these situations are associated with unpleasantness which increases feelings of apprehension and fear.

In terms of the goals of this therapy program, especially the goals of reducing fear and avoidance behavior, the fifth hypothesis of this investigation was that the stutterer's avoidance of speaking situations would be changed by the therapy program. To evaluate changes in avoidance behavior, a self-report rating scale, Stutterer's Self-Ratings of Reactions to Speech Situations (Johnson et al, 1963) was utilized. Obviously, this type of a rating scale where the person rates his degree of avoidance from "I never try to avoid this situation" to "I avoid this situation every time I possibly can" relies solely on the accuracy of the stutterer's report. However, it is considered important to evaluate this program of therapy to some extent on the basis of what the person says about his behavior.

Attitude Toward Stuttering - Many programs of therapy for stuttering described in the literature have placed emphasis on changing the stutterer's attitude toward the problem, especially his tolerance or intolerance of stuttering. It is observed generally that the adult stutterer's degree of intolerance of stuttering is related to his feeling of apprehension and desire to avoid the behavior.

It was hypothesized that this program of therapy, which had as one of its goals the altering of attitude through information, self-study, etc., would bring about a change in attitude toward stuttering, defined in terms of the Iowa Scale of Attitude Toward Stuttering (Johnson et al, 1963). It is pointed out by the originators of this scale that the attitude toward stuttering can be acquired by a stutterer in a few weeks. Whether the stutterer lives by the attitude has to be evaluated by observation. This scale is being included here because of interest in ascertaining the relationship between this change on more of an intellectual basis and the change on the other variables previously discussed.

## Review of Test Periods

All of the above measures were made at the beginning of the pre-wait period, pre-therapy period, post-therapy period and at the end of the follow up period. The Wechsler Adult Intelligence Scale was given only at the beginning of the pre-wait period. Any subject with an intellectual operating level below the average range was not included in the study.

## Facilities

The therapy program was carried out in the Speech Clinic Building on the Evanston Campus of Northwestern University. The Group Program utilized the Group Therapy Room which is a comfortably equipped room on the second floor of the Speech Clinic. Two classrooms in the building were also utilized when activities such as role playing were employed. Nineteen individual therapy rooms were used by the research program.

The psychological evaluations were done in quarters of the Division of Psychology, Department of Neurology and Psychiatry, Northwestern University Medical School, Chicago Campus.

## SUMMARY OF VARIABLES INVESTIGATED, HYPOTHESES PERTAINING TO CHANGES IN THERAPY, AND METHODS OF EVALUATION

| Variable | Hypothesis (abbreviated) | Method of Evaluation |
|---|---|---|
| 1. Stuttering behavior | 1. There will be a change in stuttering behavior. | 1. Severity ratings of reading and speaking situations using a nine point rating scale. |
| 2. Specific speech anxiety | 2. Specific speech associated anxiety will be altered. | 2. Palmar sweat measures during silence, anticipation of speaking and speaking. |
| 3. General anxiety | 3. There will be a change in general anxiety. | 3. The Taylor Manifest Anxiety Scale. |
| 4. Personality characteristics | 4. There will be a change in certain phases of the stutterer's personality characteristics. | 4. Minnesota Multiphasic Personality Inventory, Edwards Personal Preference Scale, and Holtzman Projective Test. |
| 5. Avoidance behavior | 5. Avoidance of speaking situations will be modified. | 5. Stutterer's Self-Ratings of Reactions to Speech Situations Scale. |
| 6. Attitude toward stuttering | 6. There will be a change in attitude toward stuttering. | 6. Iowa Scale of Attitude toward Stuttering. |

The recording rooms and electronics shop in the Speech Science Laboratory, located on the Evanston Campus, were used for data analysis.

Statistical computations were done at the Vogelback Computor Center, Northwestern University.

# CHAPTER III

## RESULTS

The principal purpose of this investigation was to evaluate changes during therapy in a number of variables, operationally described, and related to hypotheses about the problem of stuttering. The definition and measurement of these variables has been deliniated in the last section. The results of the study will be presented, first, as they are relevant to changes in each of these variables and the associated hypotheses and, secondly, as they provide information about prognostic indicators.

For purposes of analysis the stutterers were divided into two severity groups of eight subjects each. The division was based on pre-therapy combined speech and reading ratings. One subject of the seventeen who completed the study, the one falling in the middle of the distribution, was omitted to equalize the number comprising the "less severe" and "more severe" groups.

Analyses of variance were carried out to evaluate the mean difference between groups (less severe and more severe), change over time (pre-wait tests, pre-therapy tests, post-therapy tests, and follow up tests), and the differentiated change over time for the two groups.

The repeated measurements pooled S one factorial and one nested variable design was employed in each analysis, the only exception being the analysis of the palmar sweat scores in which a two factorial design was utilized (Winer 1962). When significant differences were ascertained on the basis of significant F-scores, a posteriori mean comparisons were made using the two tailed critical value procedure described by Winer (1962).

Comparisons of certain mean values on pre-therapy tests (e.g. the Wechsler Adult Intelligence Scale) and mean changes during therapy between the two groups was carried out statistically using Students "t" tests.

Pearson Product Moment Correlations were computed to ascertain the relationship between the changes in speech behavior during therapy and pre-therapy test results.

### Intelligence Test Results

The Wechsler Adult Intelligence Test was administered to all of the subjects during the pre-wait testing session. The plan was to take no subject with a Full Sclae Intelligence Quotient below ninety. No one had to be excluded. Furthermore, Group I (more severe) and Group II (less severe) did not differ significantly when a "t" test comparison of means on the Full Scales, Verbal Scales, and Performance Scales was done. The mean Wechsler Full Scale Intelligence Quotient for Group I was 113.13. The mean Intelligence Quotient for Group II was 109.13.

## Stuttering Behavior

Changes in stuttering were evaluated on the basis of mean severity ratings for speaking, reading, and derived reading-speaking combined scale values. Both speaking and reading measures were included in the study since research had indicated (Sander 1961) that the severity of stuttering in oral reading and speaking for a particular stutterer may differ rather widely. The composite rating was derived since stutterers would usually wish to improve in both; thus, it would be a measure of overall improvement. It should, therefore, be mentioned here that these three measures correlated significantly beyond the one per cent level of confidence at every testing period throughout the study. The Pearson Product Moment Correlations between the ratings for speaking and reading were as follows:

| | |
|---|---|
| Pre-wait testing | .875 |
| Pre-therapy testing | .768 |
| Post-therapy testing | .752 |
| Follow up testing | .876 |

Tables 1, 2, and 3 are summaries of the analysis of variance designs used to test the differences between groups, change over time, and differential change related to being less severe and more severe.

Overall Group Difference - In all three analyses, F-scores computed between group difference are significant and reach the 0.01 level of confidence (see Between Subjects, Between G, in Tables 1, 2, and 3). This means that there was an overall significant difference between the more severe group (Group I) and the less severe group (Group II) in the severity of stuttering when using either the ratings based on reading or speaking or the derived composite ratings. This computation takes into consideration the data over all four test periods. Table 4 shows the overall ratings for the two groups. In addition, a "t" test comparing mean stuttering severity ratings (speech-reading combined derived scale values) was significant beyond the 0.01 level of confidence (t= 5.28, 2.98 needed at 0.01 level for 14 df). The mean values and standard deviations on this pre-therapy rating were as follows:

Group I, M = 6.44, S.D. = 1.29
Group II, M = 3.21, S.D. = 1.06

Overall Change During Time of Study - The F-scores computed among the means at each of the four test periods, disregarding the two groups, and viewing all sixteen subjects together (see Within Subjects, Between A, in Tables 1, 2, and 3) are all three significant and reach the 0.01 level of confidence. This shows that there are overall significant changes occurring over time. Table 5 is a summary of the mean severity ratings resulting from the data gathered at each of the four test sessions during the 27 month period of the investigation. Figure 1 illustrates these changes in severity ratings. A posteriori mean comparisons were made to distinguish the specific time of occurrence of the indicated significant change in stuttering behavior. For all three types of severity scale values, decrease in stuttering between the following test periods were significant at the 0.01 level of confidence:

1. Pre-therapy (2) and post-therapy testing (3).
2. Pre-therapy (2) and follow up testing (4).
3. Pre wait (1) and post-therapy testing (3).
4. Pre-wait (1) and follow up testing (4).

The following differences were not significant:

1. Pre-wait (1) and pre-therapy testing (2).
2. Post-therapy (3) and follow up testing (4).

In terms of the research design employed in this study of therapy, the first important observation is that the severity or stuttering appeared to remain stable during the waiting period (between pre-wait testing /1/ and pre-therapy testing /2/). Therefore, it seems that for the group a rather good baseline measure of stuttering severity or change in severity over a nine month period without formal therapy was obtained.

The ratings indicate a substantial reduction in the severity of stuttering (see Table 5 and Figure 1)during the therapy period (between pre-therapy testing /2/ and post-therapy testing /3/). As previously noted, these effects were statistically significant.

Comparing this result with the finding that very little change occurs under life conditions when the subjects are not in therapy (during the waiting period), one is led to conclude that the therapy program was effectively reducing stuttering behavior.

Results of the follow up test, as shown in Table 5 and Figure 1, indicate some regression in the positive effects of therapy in that stuttering severity was slightly greater at that point than immediately after therapy. However, the *t*-test comparisons of severity means between post-therapy testing and follow up testing was not significant. On the other hand, a comparison of pre-therapy and follow up severity ratings showed the decrease in stuttering as significant at the 0.01 level of confidence. In summary, although some slight trend toward increased stuttering had occurred in the follow up period, the positive change over the 18 month period of therapy and follow up was significant.

TABLE 1

ANALYSIS OF VARIANCE SUMMARY FOR STUTTERING SEVERITY (SPEAKING)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 1110.06 | |
| Between Groups (G) | 1 | 8598.62 | 16.305** |
| Between S Within G | 14 | 549.44 | |
| Within Subjects | 48 | 194.27 | |
| Between Test Periods (A) | 3 | 1348.81 | 14.293** |
| Between AG | 3 | 438.39 | 4.646** |
| Pooled AS | 42 | 94.37 | |
| Total | 63 | | |

**Significant at the 0.01 level of confidence.

TABLE 2

ANALYSIS OF VARIANCE SUMMARY FOR STUTTERING SEVERITY (READING)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 999.74 | |
| Between Groups (G) | 1 | 6536.72 | 10.818** |
| Between S Within G | 14 | 604.24 | |
| Within Subjects | 48 | 319.11 | |
| Between Test Periods (A) | 3 | 1984.44 | 15.754** |
| Between AG | 3 | 1357.81 | 10.779** |
| Pooled AS | 42 | 125.96 | |
| Total | 63 | | |

**Significant at the 0.01 level of confidence.

### TABLE 3

### ANALYSIS OF VARIANCE SUMMARY FOR STUTTERING SEVERITY (SPEAKING-READING COMBINED)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 1006.10 | |
| Between Groups (G) | 1 | 7704.45 | 14.602** |
| Between S Within G | 14 | 527.64 | |
| Within Subjects | 48 | 229.40 | |
| Between Test Periods (A) | 3 | 1644.12 | 19.218** |
| Between AG | 3 | 828.64 | 9.686** |
| Pooled AS | 42 | 85.55 | |
| Total | 63 | | |

**Significant at the 0.01 level of confidence.

## TABLE 4

## OVER-ALL GROUP MEAN RATINGS OF STUTTERING SEVERITY

| Type Rating | (N=8) Group I (more severe) | (N=8) Group II (less severe) |
|---|---|---|
| Speaking | 5.29 | 2.92** |
| Reading | 4.95 | 2.93** |
| Speaking-Reading Combined | 5.12 | 2.93** |

** Significant at the 0.01 level of confidence.

## TABLE 5

## MEAN RATINGS OF STUTTERING SEVERITY OVER TIME OF STUDY FOR ALL STUTTERERS (N=16)

| Type Rating | Pre-Wait Testing 1 | Pre-Therapy Testing 2 | Post-Therapy Testing 3 | Follow Up Testing 4 |
|---|---|---|---|---|
| Speaking | 4.86 | 4.93 | 3.17 | 3.47 |
| Reading | 4.98 | 4.82 | 2.90 | 3.06 |
| Speaking-Reading Combined | 4.92 | 4.87 | 3.03 | 3.27 |

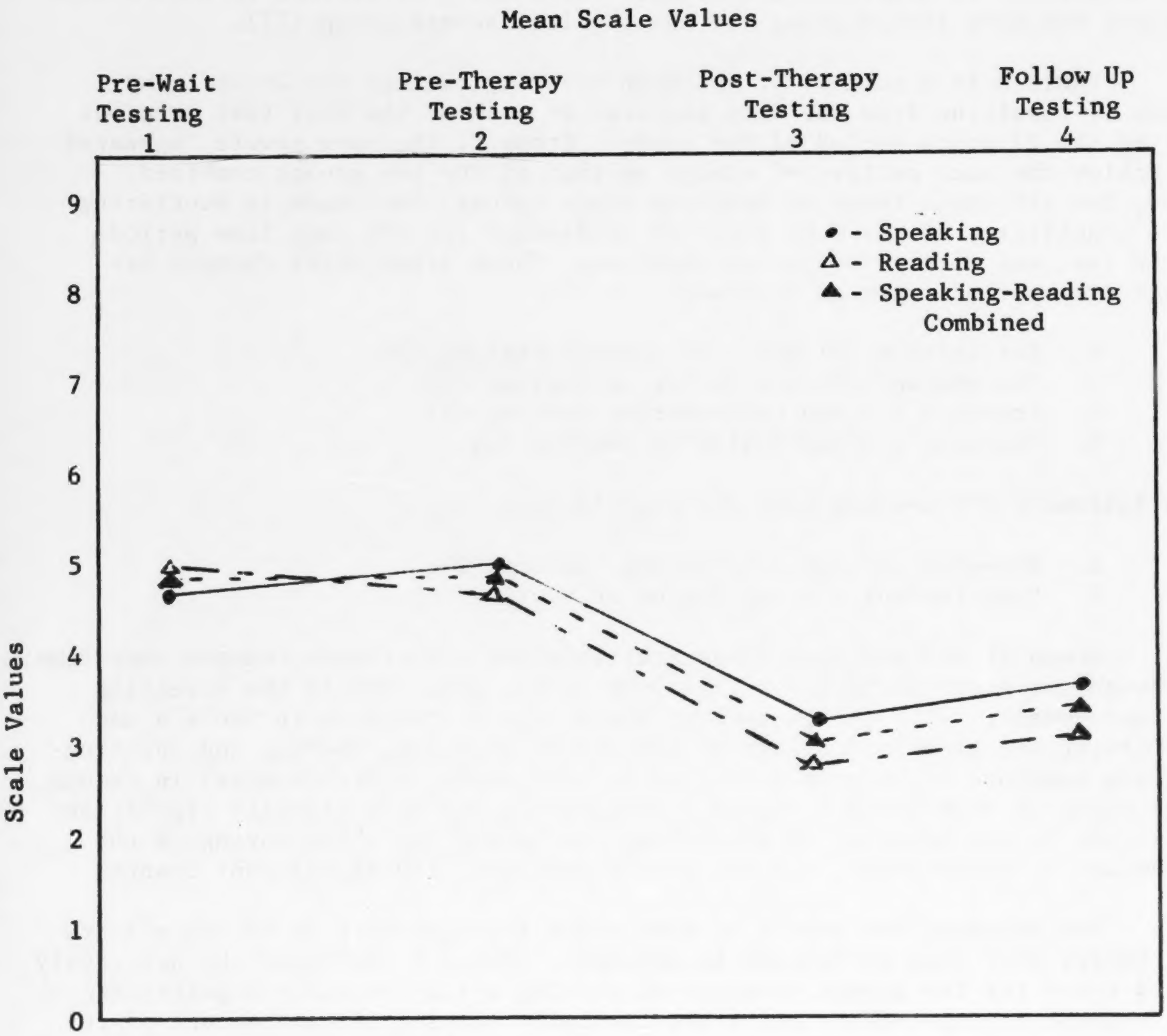

FIGURE 1. MEAN RATINGS OF STUTTERING SEVERITY OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

Differential Change Related to Severity - The F-scores computed to show the interaction between change over time and severity (see Within Subjects, Between AG, in Tables 1, 2, and 3) were significant for speaking, reading, and speaking-reading combined. This indicates that although change was occurring, as described previously, there was a difference in this change between the more severe group (I) and the less severe group (II).

Table 6 is a summary of the mean severity ratings for Group I and Group II resulting from the data gathered at each of the four test sessions during the 27 month period of the study. Group I, the more severe, appeared to follow the same pattern of change as that of the two groups combined. Thus, for all three types of severity scale values, decreases in stuttering were significant at the 0.01 level of confidence for the same time periods as in the case of the two groups combined. These significant changes between time periods were as follows:

1. Pre-therapy (2) and post-therapy testing (3).
2. Pre-therapy (2) and follow up testing (4).
3. Pre-wait (1) and post-therapy testing (3).
4. Pre-wait (1) and follow up testing (4).

The following differences were not significant:

1. Pre-wait (1) and pre-therapy testing (2).
2. Post-therapy (3) and follow up testing (4).

Group II did not show these statistically significant changes over time, although the group pattern for this less severe group was in the direction of improvement. This can be seen by inspection of the data in Table 6 and by viewing the graphic displays of changes in speaking, reading and speaking-reading combined in Figures 2, 3, and 4. Obviously, a differential in change took place in that Group I showed a substantial and statistically significant reduction in the severity of stuttering, but Group II, while moving in the direction of improvement, did not show a statistically significant change.

Two observations should be made about this interaction of the effects of therapy over time as related to severity. Group I, followed the previously noted trend for the groups combined of showing a statistically significant improvement during therapy and a statistically non-significant amount of relapse during the follow-up period. Group II, which did not show a statistically significant improvement during therapy, but a trend toward improvement, continued this trend during the follow up period. As a group, they did not show regression as did Group I. The second fact to be noted is that the two severity groups became more homogenous during therapy. Seperate comparisons of post-therapy severity ratings for Groups I and II on speaking, reading, and speaking-reading combined were not significant. These differences can be observed in Table 6 in the column for post-therapy testing (3) and can be viewed graphically in Figures 2, 3, and 4. Statistically, the groups became homogenous during therapy; however, it can be seen that the largest difference between the two severity groups was on the speaking tasks, post-therapy.

## TABLE 6

MEAN RATINGS OF STUTTERING SEVERITY OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS

| Type Rating | Pre-Wait Testing 1 | Pre-Therapy Testing 2 | Post-Therapy Testing 3 | Follow Up Testing 4 |
|---|---|---|---|---|
| Speaking | | | | |
| Group I | 6.52 | 6.46 | 3.67 | 4.52 |
| Group II | 3.21 | 3.40 | 2.66 | 2.42 |
| Reading | | | | |
| Group I | 6.92 | 6.42 | 2.84 | 3.62 |
| Group II | 3.04 | 3.22 | 2.95 | 2.50 |
| Speaking-Reading Combined | | | | |
| Group I | 6.72 | 6.44 | 3.26 | 4.07 |
| Group II | 3.13 | 3.31 | 2.81 | 2.47 |

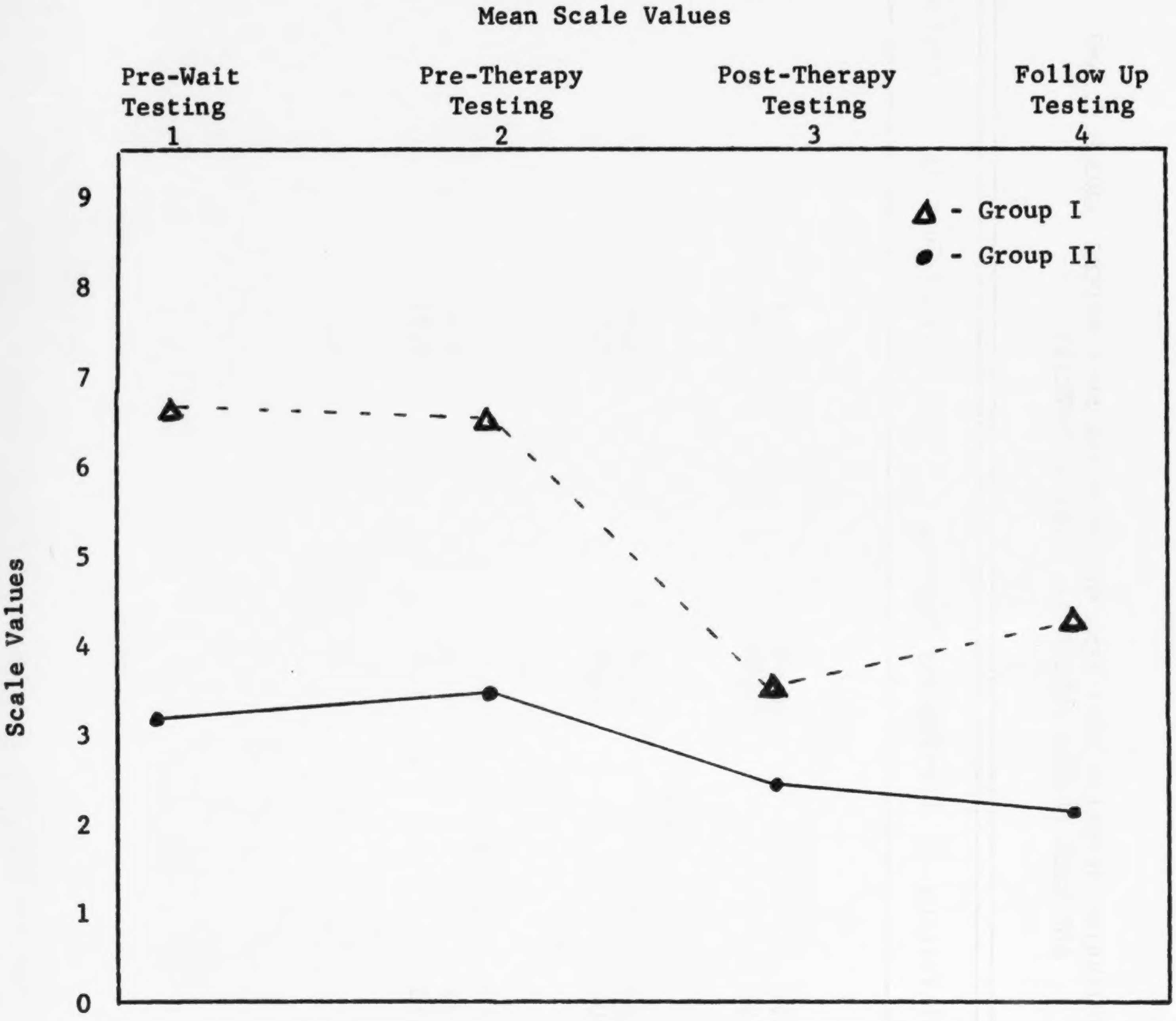

FIGURE 2. COMPARISON OF MEAN RATINGS OF STUTTERING SEVERITY (SPEAKING) OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

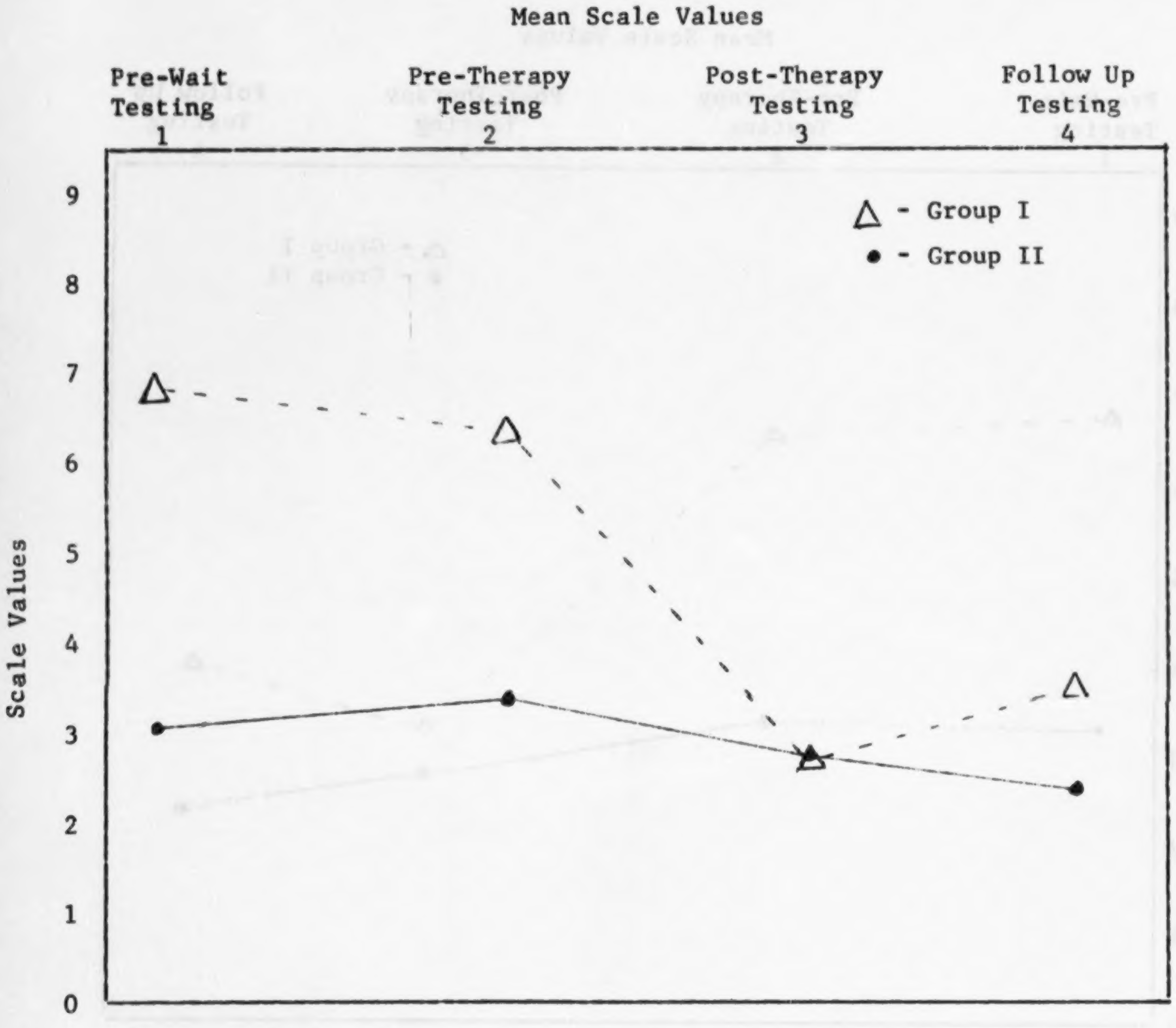

FIGURE 3. COMPARISON OF MEAN RATINGS OF STUTTERING SEVERITY (READING) OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

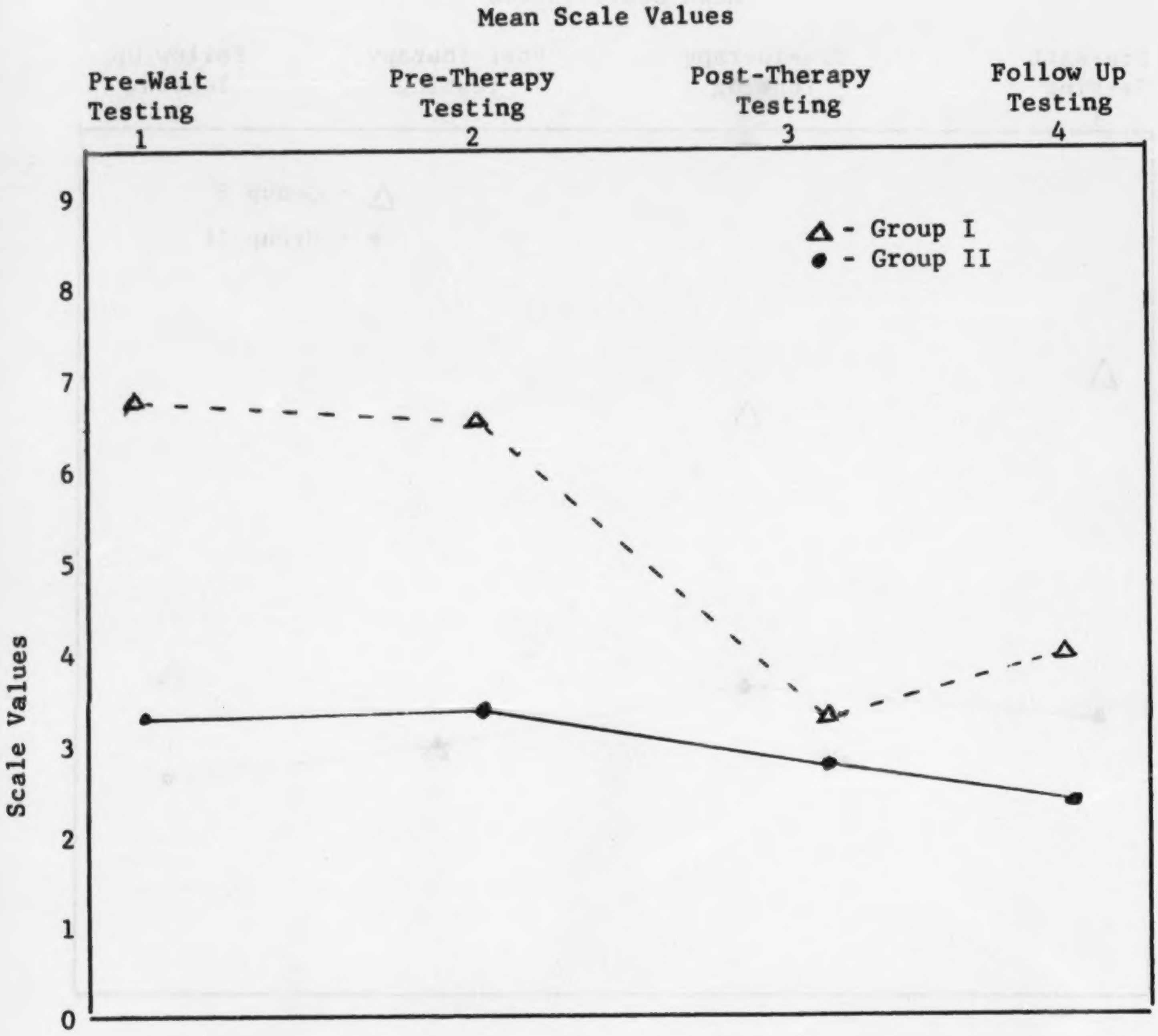

FIGURE 4. COMPARISON OF MEAN RATINGS OF STUTTERING SEVERITY (SPEAKING-READING COMBINED) OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

This difference (Group I = 3.67, Group II = 2.66) approaches significance at the 0.05 level of confidence. A third observation pertaining to the interaction of change over time and severity is that the two groups diverged from each other in stuttering severity during the follow-up period. Group I, as previously noted, showed some regression from the positive effects of therapy but Group II continued to improve. The two groups differed significantly in the severity of stuttering during speaking and speaking-reading combined at the time of follow up tests (4). The difference in severity between the groups on the reading task was not statistically significant at that time; however, the difference was approaching significance at the 0.05 level of confidence.

## Reactions to Speaking Situations

The Stutterer's Self-Rating of Reactions to Speaking Situations (Johnson, Darley and Spriesterbach 1963, Shumak 1955) was used to sample the following four aspects of the subject's adjustment to speaking situations: (1) avoidance of speaking situations, (2) reactions to the situations, (3) frequency of stuttering, and (4) frequency of encountering the situation. Each of a list of forty common types of speaking situations was rated by the subject, using a five point scale.

Tables 7, 8, 9, and 10 are summaries of the analyses of variance employed to test the difference between groups, change over time, and differential change related to severity. In all four analyses, the F-scores computed between group differences are not significant. In other words, the less severe and more severe stutterers do not differ in their self-ratings of these dimensions. The F-scores computed among the mean ratings for all 16 subjects at each of the four test periods (see Within Subjects, Between A, in Tables 7, 8, 9, and 10) are significant at the 0.01 level of confidence for avoidance, reaction and stuttering. There was no significant difference with reference to frequency of encountering situations.

Inspection of Table 11, which shows the means of the data gathered at each of the four test sessions, reveals that the direction of change during therapy and the follow up period is toward less avoidance, more enjoyment of speaking situations, and less stuttering in these situations than before therapy.

Decreases in self-reported avoidance behavior and distasteful reactions to speaking situations between the following test periods were significant at the 0.01 level of confidence:

1. Pre-therapy (2) and post-therapy testing (3).
2. Pre therapy (2) and follow up testing (4).
3. Pre-wait (1) and post-therapy testing (3).
4. Pre-wait (1) and follow up testing (4).

TABLE 7

ANALYSIS OF VARIANCE SUMMARY FOR AVOIDANCE
(STUTTERER'S SELF-RATINGS OF REACTIONS TO SPEECH SITUATIONS)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 96.327 | |
| Between Groups (G) | 1 | 134.850 | 1.441 |
| Between S Within G | 14 | 93.575 | |
| Within Subjects | 48 | 16.494 | |
| Between Test Periods (A) | 3 | 131.398 | 14.612** |
| Between AG | 3 | 6.609 | .735 |
| Pooled AS | 42 | 8.992 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

## TABLE 8

## ANALYSIS OF VARIANCE SUMMARY FOR REACTION (STUTTERER'S SELF-RATINGS OF REACTIONS TO SPEECH SITUATIONS)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 62.067 | |
| Between Groups (G) | 1 | 8.851 | .134 |
| Between S Within G | 14 | 65.868 | |
| Within Subjects | 48 | 16.477 | |
| Between Test Periods (A) | 3 | 106.669 | 9.628** |
| Between AG | 3 | 1.849 | .167 |
| Pooled AS | 42 | 11.079 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

## TABLE 9

## ANALYSIS OF VARIANCE SUMMARY FOR STUTTERING (STUTTERER'S SELF-RATINGS OF REACTIONS TO SPEECH SITUATIONS)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 135.968 | |
| Between Groups (G) | 1 | 90.250 | .648 |
| Between S Within G | 14 | 139.234 | |
| Within Subjects | 48 | 9.404 | |
| Between Test Periods (A) | 3 | 37.814 | 4.905** |
| Between AG | 3 | 4.725 | .613 |
| Pooled AS | 42 | 7.709 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

## TABLE 10

## ANALYSIS OF VARIANCE SUMMARY FOR FREQUENCY (STUTTERER'S SELF-RATINGS OF REACTIONS TO SPEECH SITUATIONS)

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 53.546 | |
| Between Groups (G) | 1 | 126.562 | 2.619 |
| Between S Within G | 14 | 48.331 | |
| Within Subjects | 48 | 9.000 | |
| Between Test Periods (A) | 3 | 10.462 | 1.182 |
| Between AG | 3 | 9.621 | 1.087 |
| Pooled AS | 42 | 8.851 | |
| Total | 63 | | |

## TABLE 11

## MEAN RATINGS OF AVOIDANCE, REACTIONS TO SPEAKING SITUATIONS, AND FREQUENCY OF STUTTERING ON THE STUTTERER'S SELF-RATINGS OF REACTIONS TO SPEAKING SITUATIONS

| Type Rating | Pre-Wait Testing 1 | Pre-Therapy Testing 2 | Post-Therapy Testing 3 | Follow Up Testing 4 |
|---|---|---|---|---|
| Avoidance | 2.14 | 2.19 | 1.68 | 1.67 |
| Reaction | 2.32 | 2.24 | 1.85 | 1.82 |
| Stuttering | 2.41 | 2.46 | 2.21 | 2.14 |

The following were not significant:

1. Pre-wait (1) and pre-therapy testing (2).
2. Post-therapy (3) and follow up testing (4).

Decreases in self-reported stuttering in the speaking situations evaluated between the following time periods were significant at the 0.01 level of confidence:

1. Pre-therapy (2) and follow up testing (4).
2. Pre-wait (1) and follow up testing (4).

The decrease in self-reported stuttering between pre-therapy (2) and post-therapy testing (3) was significant at the 0.05 level of confidence. The following differences were not significant:

1. Pre-wait (1) and pre-therapy testing (2).
2. Pre-wait (1) and post-therapy testing (3).
3. Post-therapy (3) and follow up testing (4).

It is concluded that in terms of self-reporting, the stutterers were avoiding less, enjoying speaking situations more, and stuttering in these situations less than before therapy. It should be noted again that the difference from pre-therapy to post-therapy for stuttering frequency was different at the 0.05 level of confidence, whereas avoidance and reaction differed at the 0.01 level of confidence. These changes were maintained at the time of follow up testing nine months after therapy.

The F-scores computed to reveal the possible interaction between changes in these variables over time as related to severity (see Within Subjects, Between AG in Tables 7, 8, 9, and 10) were not significant.

## Attitude Toward Stuttering

The Iowa Scale of Attitude Toward Stuttering was employed to evaluate the subjects tolerance or intolerance of stuttering. It was mentioned inthe previous chapter that a better attitude, as measured by this scale, can be acquired readily, and that clinicians must observe the subject for verifiation that his behavior is different. The present investigator believes that a change on the intellectual level is important -- that change in thinking s often necessary before there can be a change in overt behavior. Therefor, there was interest in the way change on the attitude scale paralleled chage in stuttering.

Examination of Table 12, the analysis of variance for the attitude variable, reveals one significant F-score, that for the mean ratings for all sixteen subjects across time (see Within Subjects, Between A). The oange across the four test periods is significant at the 0.01 level of confidece. Figure 5 shows the pattern of change. The following differences were

## TABLE 12

## ANALYSIS OF VARIANCE SUMMARY FOR ATTITUDE

| Source of Variance | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 40.428 | |
| Between Groups (G) | 1 | 15.602 | .370 |
| Between S Within G | 14 | 42.202 | |
| Within Subjects | 48 | 22.577 | |
| Between Test Periods (A) | 3 | 175.531 | 13.557** |
| Between AG | 3 | 4.431 | .342 |
| Pooled AS | 42 | 12.948 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

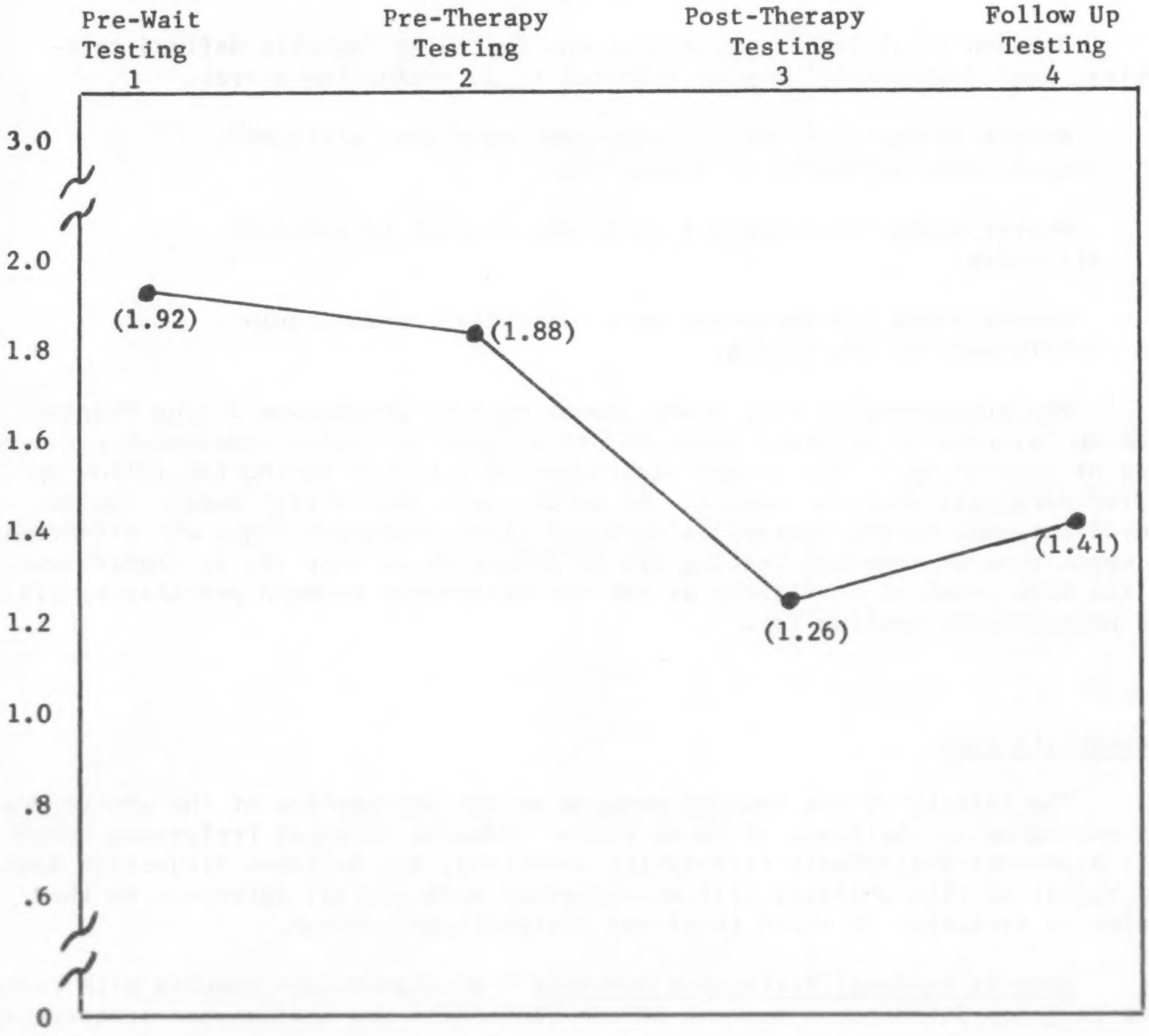

FIGURE 5. COMPARISON OF MEAN RATINGS OF ATTITUDE TOWARD STUTTERING OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

significant at the 0.01 level of confidence:

1. Pre-therapy (2) and post-therapy testing (3).
2. Pre-therapy (2) and follow up testing (4).
3. Pre-wait (1) and post-therapy testing (3).
4. Pre-wait (1) and follow up testing (4).

Johnson et al (1963) state that the following "roughly defined categories, used judiciously" may be referred to in evaluating scores.

> Scores between 1.0 and 1.4 represent very good attitudes, considerable tolerance of stuttering.
>
> Scores between 1.4 and 2.2 represent average or moderate attitudes.
>
> Scores above 2.2 represent poor attitudes, considerable intolerance of stuttering.

The stutterers in this study appear to have progressed during therapy from an "average or moderate attitude" to a "good attitude, considerable tolerance of stuttering." The slight regression of attitude during the follow up period parallels that for speech. As noted, on a statistical basis, the improved attitude during therapy is retained after treatment since the difference in means from pre-therapy testing (2) to follow up testing (4) is significant at the 0.01 level of confidence as was the difference between pre-therapy (2) and post-therapy testing (3).

## Personality Data

The effects of the therapy program on the personality of the stutterers was evaluated on the basis of three tests: Edwards Personal Preference Schedule, Minnesota Multiphasic Personality Inventory, and Holtzman Projective Test. The result of this analysis will be described with special reference to the scales or variables on which there was a significant change.

Edwards Personal Preference Schedule - No significant results with reference to group differences between severe stutterers and less severe stutterers, change over time for all sixteen subjects, and differential change over time related to severity were found for the following personality variables:

Achievement
Deference
Exhibition
Autonomy
Affiliation
Intraception
Dominance
Nurturance
Change
Endurance
Heterosexuality
Aggression
Consistency

Significant results occurred on the order, succorance, and abasement variables. Tables 13, 14, and 15 are summaries of the analyses of variance for these three variables. In all three analyses, the F-scores for between-group differences are not significant, that is the less severe and more severe stutterers do not differ on these three personality dimensions.

Table 13 shows that the differences in means for the order variable for all sixteen subjects at each of the four test periods (see Within Subjects, Between AG) was significant at the 0.05 level of confidence. Figure 6 illustrates the patterns of these changes and the interaction. The following mean differences in Group I (more severe) were significant at the 0.05 level of confidence:

1. Pre-therapy (2) and post-therapy testing (3).
2. Post-therapy (3) and follow up testing (4).

None of the differences between means for Group II (less severe) were significant. The two groups, however, differ at the 0.05 level of confidence at the time of post-therapy testing. The difference between the two groups at the time of pre-therapy testing approaches significance at the 0.05 level of confidence.

On the order variable the two groups become more homogeneous from the time of pre-wait testing to pre-therapy testing. During therapy the severe stutterers (Group I) show a significant increase on this variable (0.05 level of confidence). Edwards (1959) describes a change of this sort as indicating increased organization, planning, arranging and other similar manifestations. Other psychological descriptions might include a tendency to be more obsessive-compulsive, although Edwards does not use these terms. Thus, it appears that a significant improvement in speech, as noted previously for Group I, is accompanied by a less significant increase in this trait of orderliness. There are several possibilities which may account for this finding. First, it may be that one of the effects of the therapy program with its emphasis on analysis and modification of behavior is to increase the orderliness and organization of a person, not only regarding his speech, but his functioning in general. Secondly, the increase on the order variable may reveal that therapy makes the severe stutterers more anxious and brings about a mobilization of this characterologic trait as a defense against anxiety. Related to this is the possibility that improvement in speech brings with it, as Sheehan (1958) has stressed, anxiety about getting better.

Figure 6 also shows the decrease between post-therapy testing and follow up testing (significant at the 0.05 level of confidence) in the order variable for Group I. Order as a dimension of personality returns to the pre-therapy level during a nine-month follow up period. Some relapse, but not a significant one, in speech improvement also occurred in Group I as this relapse in orderliness took place. Consequently, it appears that changes in this variable and speech are related in a rather important way, at least in this particular program of therapy.

## TABLE 13

## ANALYSIS OF VARIANCE SUMMARY FOR EPPS ORDER VARIABLE

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 2913.307 | |
| Between Groups (G) | 1 | 558.141 | .181 |
| Between S Within G | 14 | 3081.533 | |
| Within Subjects | 48 | 238.734 | |
| Between Test Periods (A) | 3 | 131.474 | .622 |
| Between AG | 3 | 727.641 | 3.441* |
| Pooled AS | 42 | 211.474 | |
| Total | 63 | | |

*Significant at the 0.05 level of confidence.

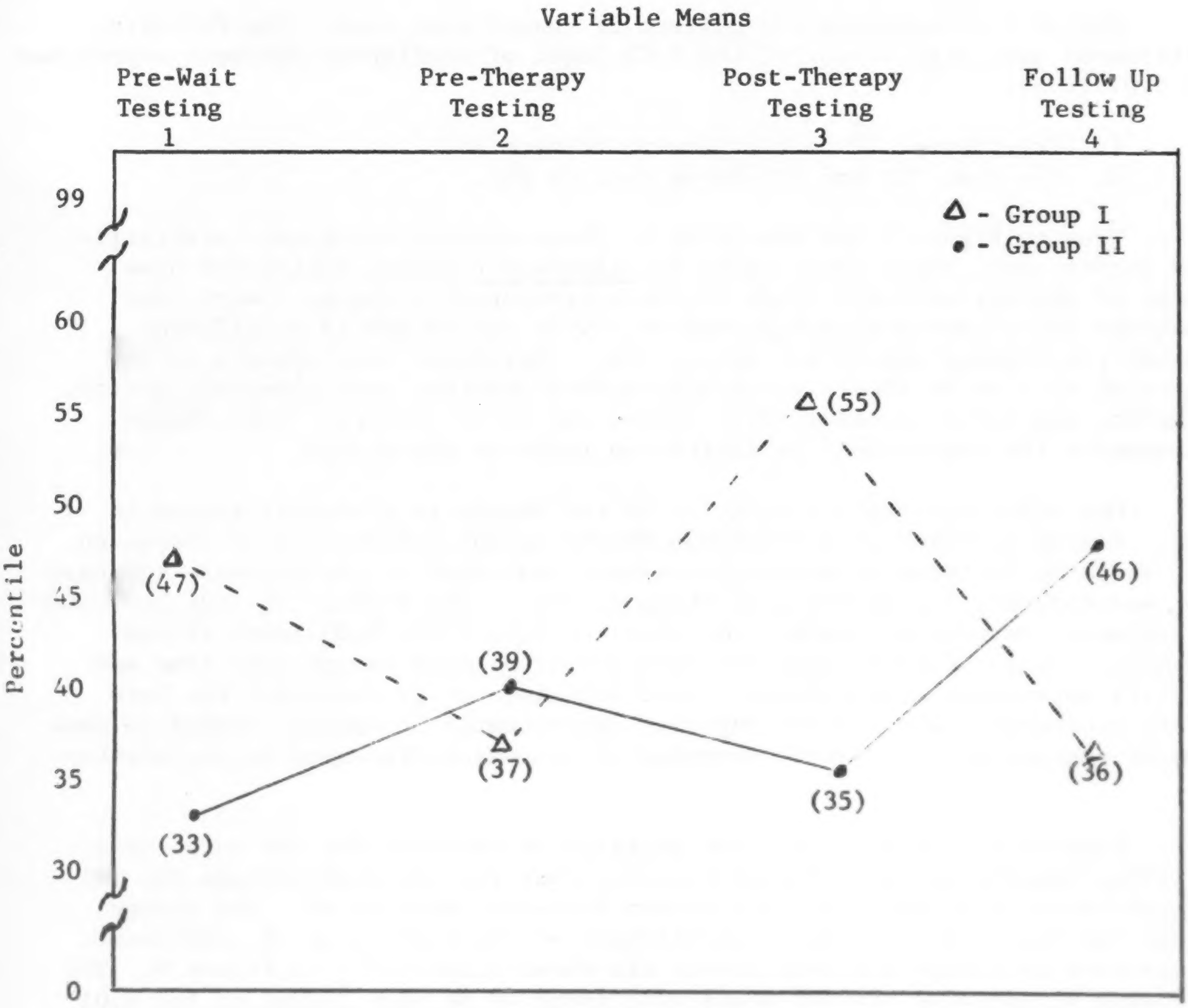

FIGURE 6. COMPARISON OF MEAN SCORES FOR ORDER VARIABLE (EPPS) OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

Table 14 shows that the mean differences for the abasement variable for all sixteen subjects at each of the four test periods (see Within Subjects, Between A) was significant at the 0.05 level of confidence. The other two F-scores, (between groups and over time by severity) were not significant.

Figure 7 illustrates the pattern of change over time. The following differences were significant at the 0.05 level of confidence and both approached the 0.01 level.

1. Pre-therapy (2) and follow up testing (4).
2. Pre-wait (1) and follow up testing (4).

Viewing Figure 7 and referring to these changes which were statistically significant, there seems to be no significant change during the nine months of therapy although there is the beginning of a change toward less abasement which continues during the follow up period and is significant between pre-therapy and follow up testing. Therefore, what appears to be occurring is a shift toward being less self-demeaning, self-effacing, guilty, inferior, and timid (Edwards 1959) during and after therapy. This change accompanies the improvement in stuttering found in the study.

One other observation relative to the change in abasement should be made. Figure 8, which is a breakdown of the amount and pattern of change on this variable in terms of severity, reveals that most of the decrease in abasement was concentrated in Group II (less severe). The F-score of 2.76 for Within Subjects, Between AG, falls just short of 2.84 ( the 0.05 level of confidence). This indicates that the interaction between change over time and severity approaches significance. In conclusion, it is seen that the less severe stutterers, who did not improve significantly in speech, tended to show a major portion of the overall decrease in abasement displayed by the stutterers.

Examination of Table 15, the analysis of variance for the succorance variable, reveals one significant F-score, that for the mean ratings for all sixteen subjects across time (see Within Subjects, Between A). The change across the four test periods is significant at the 0.01 level of confidence. The pattern of change and mean scores are shown graphically in Figure 9. The following differences between means were found to be significant at the 0.01 level of confidence:

1. Pre-therapy (2) and post-therapy testing (3).
2. Pre-therapy (2) and follow up testing (4).

Apparently, therapy tends to make a heterogeneous (based on severity) group of adult stutterers less succorant. According to Edwards (1959) the stutterers in this study became less dependent, less in need of others sympathy and understanding about problems, and less in need of having a "fuss made over." The non-significant difference between post-therapy (3) and follow up testing (4) attests to the fact that once this behavioral, intrapsychic alteration takes place, it does not change in a significant way over

2

## TABLE 14

## ANALYSIS OF VARIANCE SUMMARY FOR EPPS ABASEMENT VARIABLE

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 1648.724 | |
| Between Groups (G) | 1 | .141 | .000 |
| Between S Within G | 14 | 1766.480 | |
| Within Subjects | 48 | 372.370 | |
| Between Test Periods (A) | 3 | 891.766 | 2.951* |
| Between AG | 3 | 836.099 | 2.767' |
| Between AS | 42 | 302.147 | |
| Total | 63 | | |

* Significant at the 0.05 level of confidence.
' Approaches the 0.05 level of confidence.

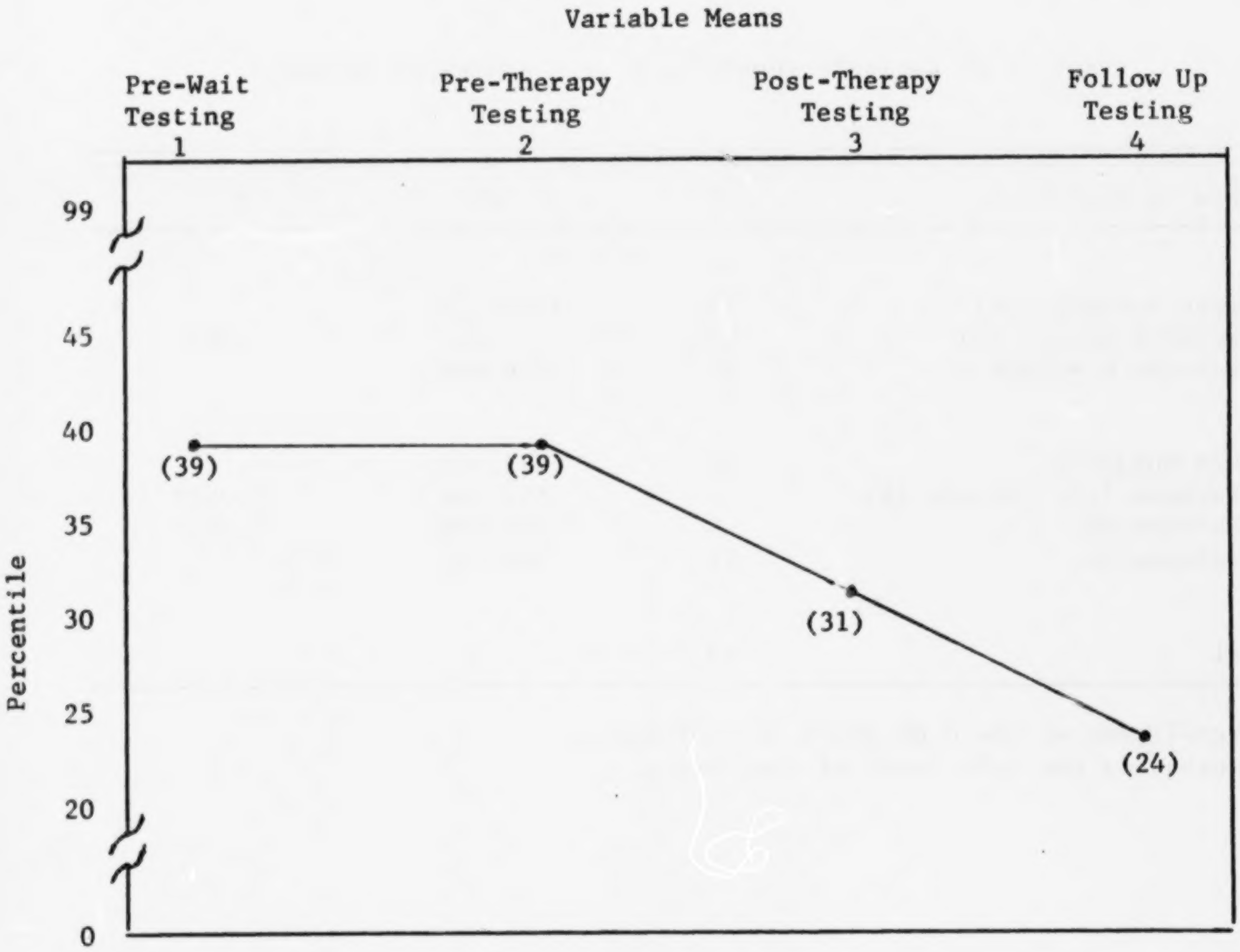

FIGURE 7. COMPARISON OF MEAN SCORES FOR ABASEMENT VARIABLE (EPPS) OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

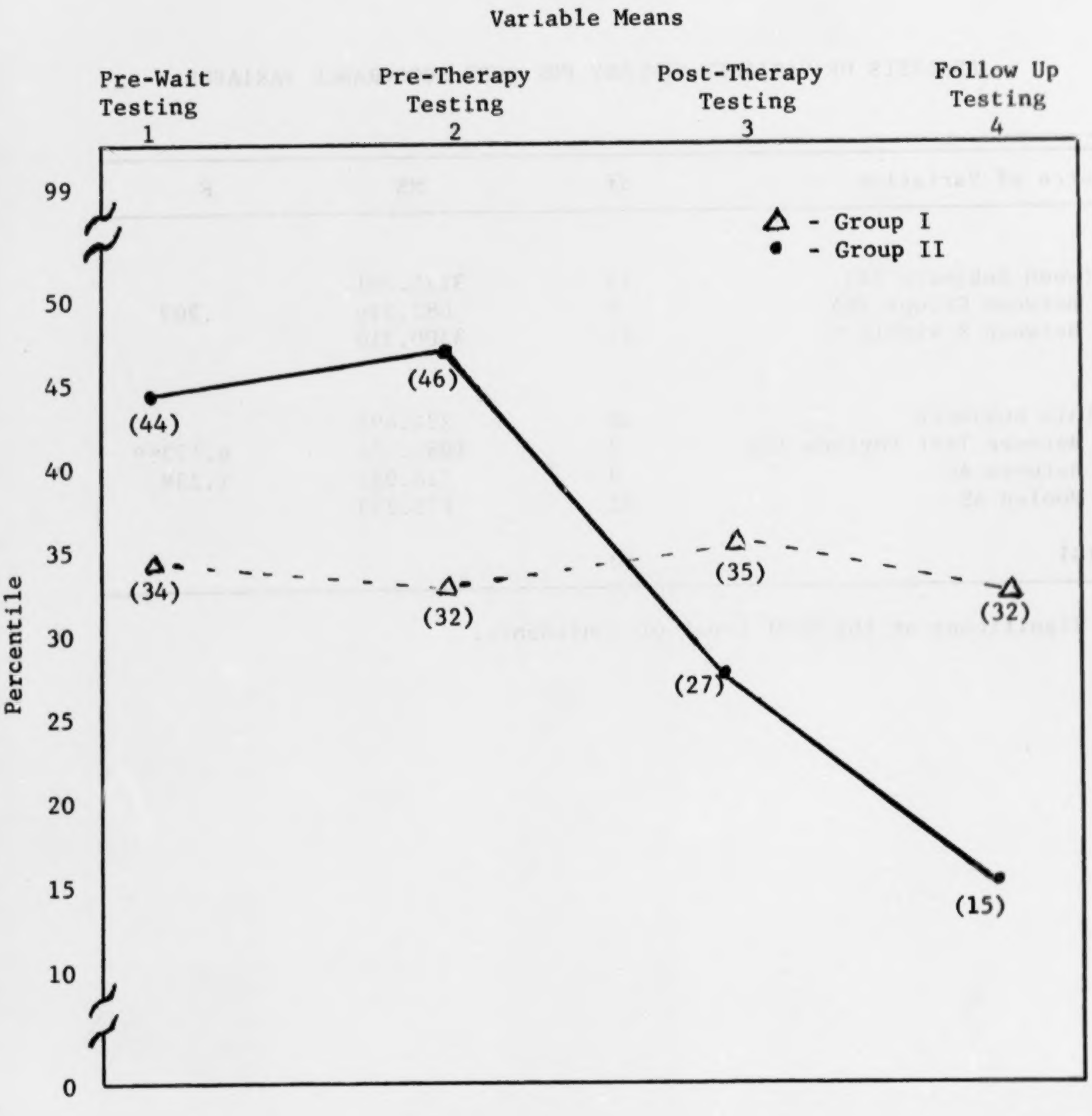

FIGURE 8.COMPARISONS OF MEAN SCORES FOR ABASEMENT VARIABLE (EPPS) OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

## TABLE 15

## ANALYSIS OF VARIANCE SUMMARY FOR EPPS SUCCORANCE VARIABLE

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 3125.791 | |
| Between Groups (G) | 1 | 682.516 | .207 |
| Between S Within G | 14 | 3300.310 | |
| Within Subjects | 48 | 234.495 | |
| Between Test Periods (A) | 3 | 1081.724 | 6.173** |
| Between AG | 3 | 216.932 | 1.238 |
| Pooled AS | 42 | 175.233 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

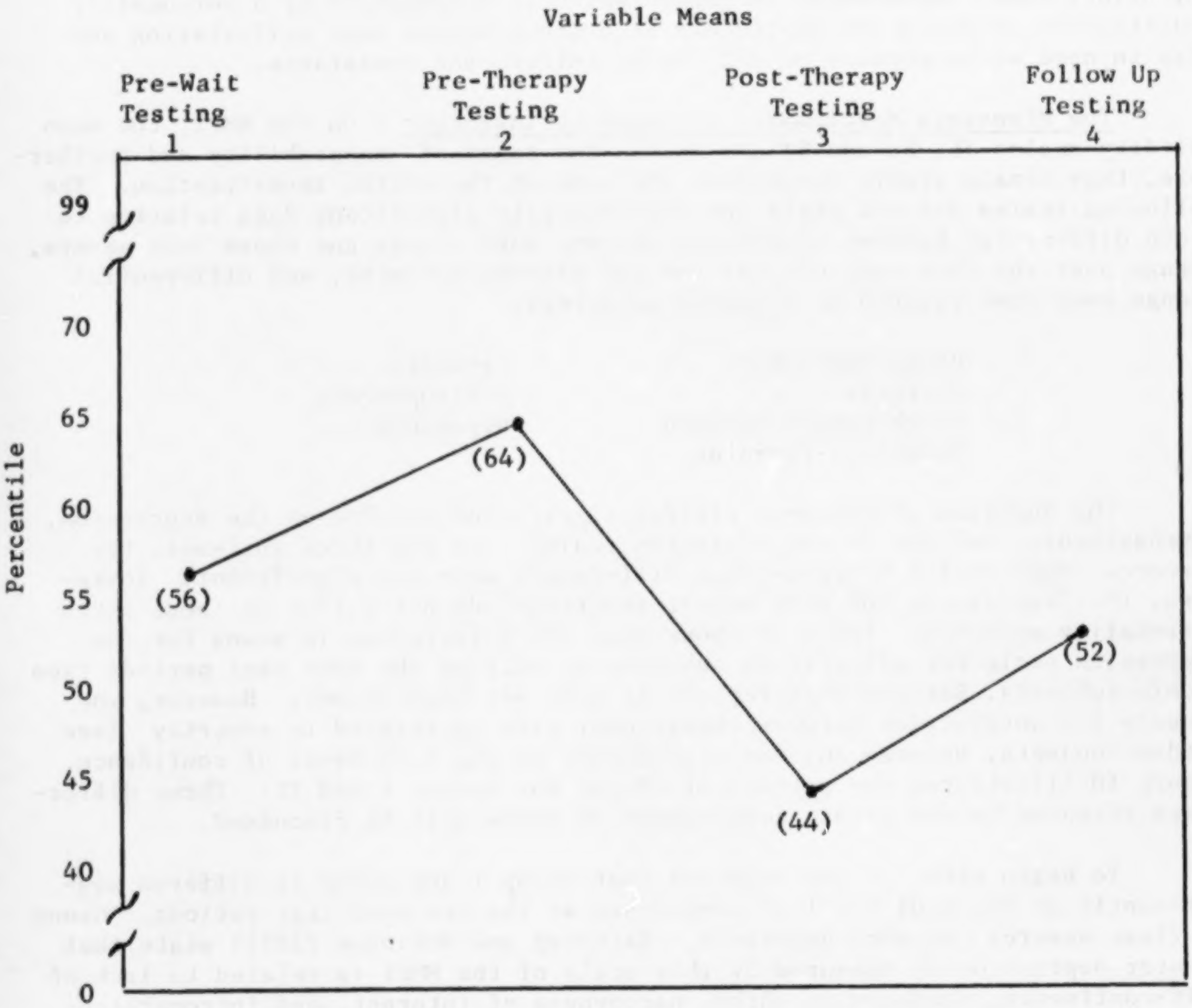

FIGURE 9. COMPARISON OF MEAN SCORES FOR SUCCORANCE VARIABLE (EPPS) OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

a nine-month non-therapy period.

The findings from the Edwards variables of abasement and succorance seem to present a picture of change which is congruous. The process of therapy brings about improvement in speech which is accompanied by a personality modification in which the stutterers as a group became less self-abasing and less in need of succorance or aid, help, relief, and assistance.

The Minnesota Multiphasic Personality Inventory - On the MMPI, the mean validity scales (L, F, and K) are within the range of acceptability and furthermore, they remain stable throughout the time of the entire investigation. The following scales did not yield any statistically significant data relative to group differences between stutterers who are more severe and those less severe, change over the four test periods for all sixteen subjects, and differential change over time related to severity groupings.

Hypochondriasis
Hysteria
Psychopathic Deviate
Masculine-Feminine

Paranoia
Schizophrenia
Hypomania

The analyses of variance yielded significant results on the depression, psychasthenic, and the social isolation scales. In all three analyses, the F-scores computed for between-group differences were not significant. Therefore, the less severe and more severe stutterers do not differ on these three personality measures. Table 16 shows that the differences in means for the depression scale for all sixteen subjects at each of the four test periods (see Within Subjects, Between Test Periods A) were not significant. However, the F-score for interaction between change over time as related to severity (see Within Subjects, Between AG) was significant at the 0.05 level of confidence. Figure 10 illustrates the pattern of change for Groups I and II. Three differences revealed by the t-test comparisons of means will be discussed.

To begin with, it was observed that Group I and Group II differed significantly at the 0.01 level of confidence at the pre-wait test periods. Group II (less severe) was more depressed. Hathaway and McKinley (1951) state that greater depression as measured by this scale of the MMPI is related to lack of self-confidence, tendency to worry, narrowness of interest, and introversion: Group I (more severe) showed no significant shifts on this scale during the entire period of the study. For Group II (less severe) the following two differences were significant at the 0.01 level of confidence:

1. Pre-wait (1) and post-therapy testing (3).
2. Pre-wait (1) and follow up testing (4).

These changes indicate, as is shown graphically in Figure 10, that a change in the direction of less intrapsychic depression begins during the waiting period and continues during therapy. During the follow up period there was no meaningful change in this characteristic. It seems reasonable

TABLE 16

ANALYSIS OF VARIANCE SUMMARY FOR MMPI DEPRESSION SCALE

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 199.533 | |
| Between Groups (G) | 1 | 484.000 | 2.701 |
| Between S Within G | 14 | 179.214 | |
| Within Subjects | 48 | 51.562 | |
| Between Test Periods (A) | 3 | 76.958 | 1.774 |
| Between AG | 3 | 140.542 | 3.239* |
| Pooled AS | 42 | 43.393 | |
| Total | 63 | | |

*Significant at the 0.05 level of confidence.

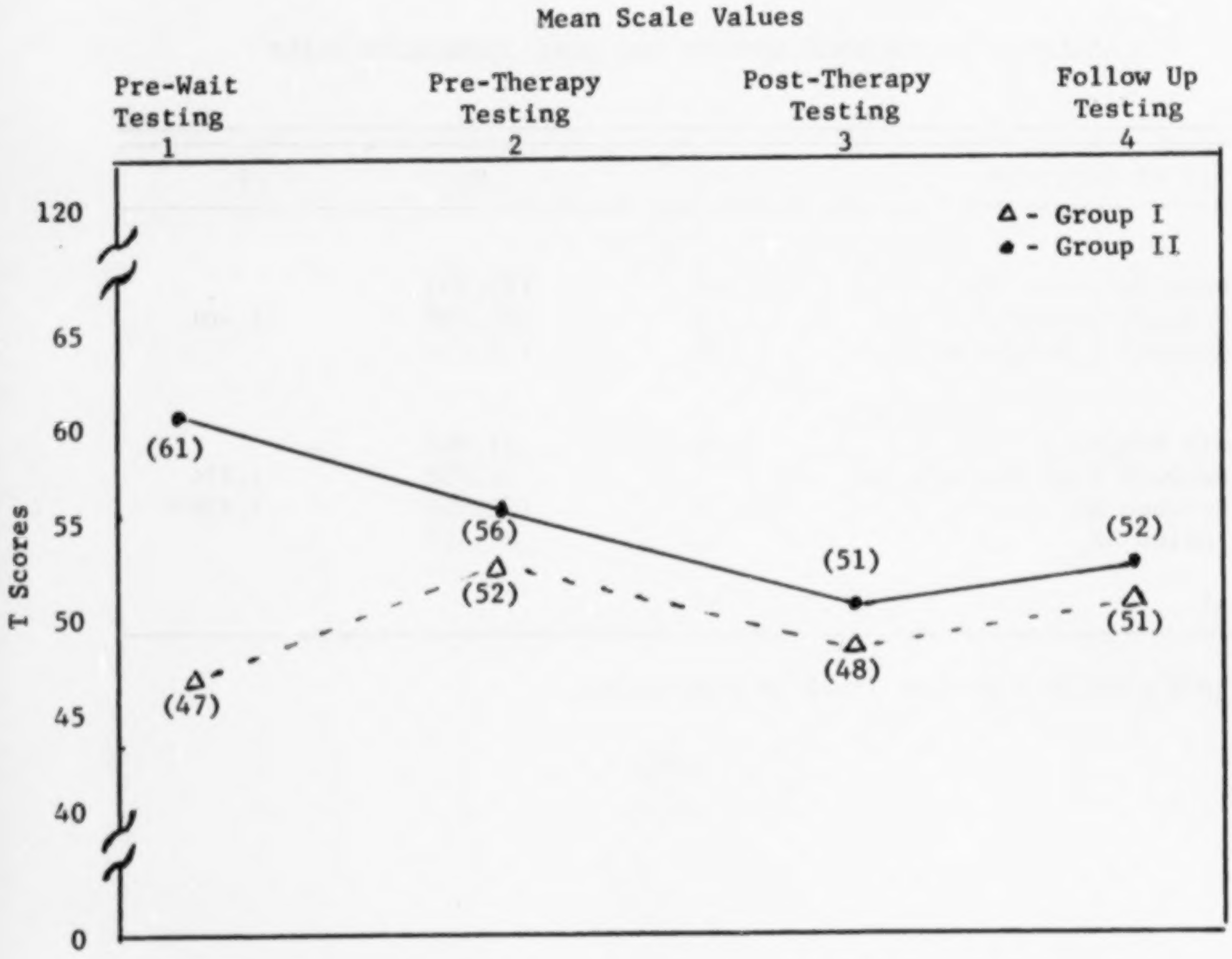

FIGURE 10. COMPARISON OF MEAN SCORES ON DEPRESSION SCALE (MMPI) OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

to conclude that the knowledge that a therapy program was going to be available was sufficient to begin a trend toward less depression which continued on a group basis during the therapy program. Hathaway and McKinley (1951) mention that some high scoring individuals will show rapid improvement on this scale with "pep talks and psychotherapy." In other words, this scale tends to reflect rather reliably a more optimistic feeling in a subject. However, in summary it cannot be said that the therapy program itself has a positive effect with reference to depression. One last observation of this data is that over the course of the study Groups I and II became more homogeneous after being significantly different at the pre-wait test period.

It has been shown above that the less severe stutterers showed a decrease in depression which began during the pre-wait period. A similar change in psychasthenia, but this time for all sixteen subjects as a group, appears to take place during the course of the investigation. Table 17, a summary of the analysis of variance design used to evaluate this scale, shows that the F-score for change across the four test periods for all sixteen stutterers (see Within Subjects, Between A) was significant at the 0.05 level of confidence. _T_-test comparisons of means revealed the following differences which were significant at the 0.05 level of confidence:

1. Pre-wait (1) and post-therapy testing (3).
2. Pre-wait (1) and follow up testing (4).

Figure 11 illustrates the change over time on the psychasthenia scale. The anticipation of therapy appears to initiate a lessening of this personality characteristic which becomes significant after therapy (comparing pre-wait /1/ and post-therapy testing /3/). This change holds during the follow up period. The F-score for evaluating differential change over time for the two groups on the psychasthenia scale was not significant. It is concluded that therapy per se does not have a significant impact on the characteristic assessed on this scale, but that a diminution of phobic behavior, excessive worry, and inability to concentrate -- some of the personality traits measured by the scale -- does occur during the waiting for therapy and the actual therapy periods. The improvement stabilizes during the nine-month period following therapy.

The findings on the social isolation scale of the MMPI are very much like the results on the previously discussed psychasthenia scale. Table 18 shows that the only analysis which was significant was that of change in all sixteen stutterers over time of the study (significant at the 0.05 level of confidence). The _t_-test comparison of means between pre-wait testing (1) and pre-therapy testing (2) was significant at the 0.05 level of confidence. The change during therapy was not a significant one: however, the following two differences were significant at the 0.01 level of confidence:

1. Pre-wait (1) and post-therapy testing (3).
2. Pre-wait (1) and follow up testing (4).

## TABLE 17

## ANALYSIS OF VARIANCE SUMMARY FOR MMPI PSYCHASTHENIA SCALE

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 232.417 | |
| Between Groups (G) | 1 | 588.062 | 2.841 |
| Between S Within G | 14 | 207.013 | |
| Within Subjects | 48 | 50.573 | |
| Between Test Periods (A) | 3 | 128.167 | 3.004* |
| Between AG | 3 | 83.729 | 1.963 |
| Pooled AS | 42 | 42.662 | |
| *Total* | 63 | | |

*Significant at the 0.05 level of confidence.

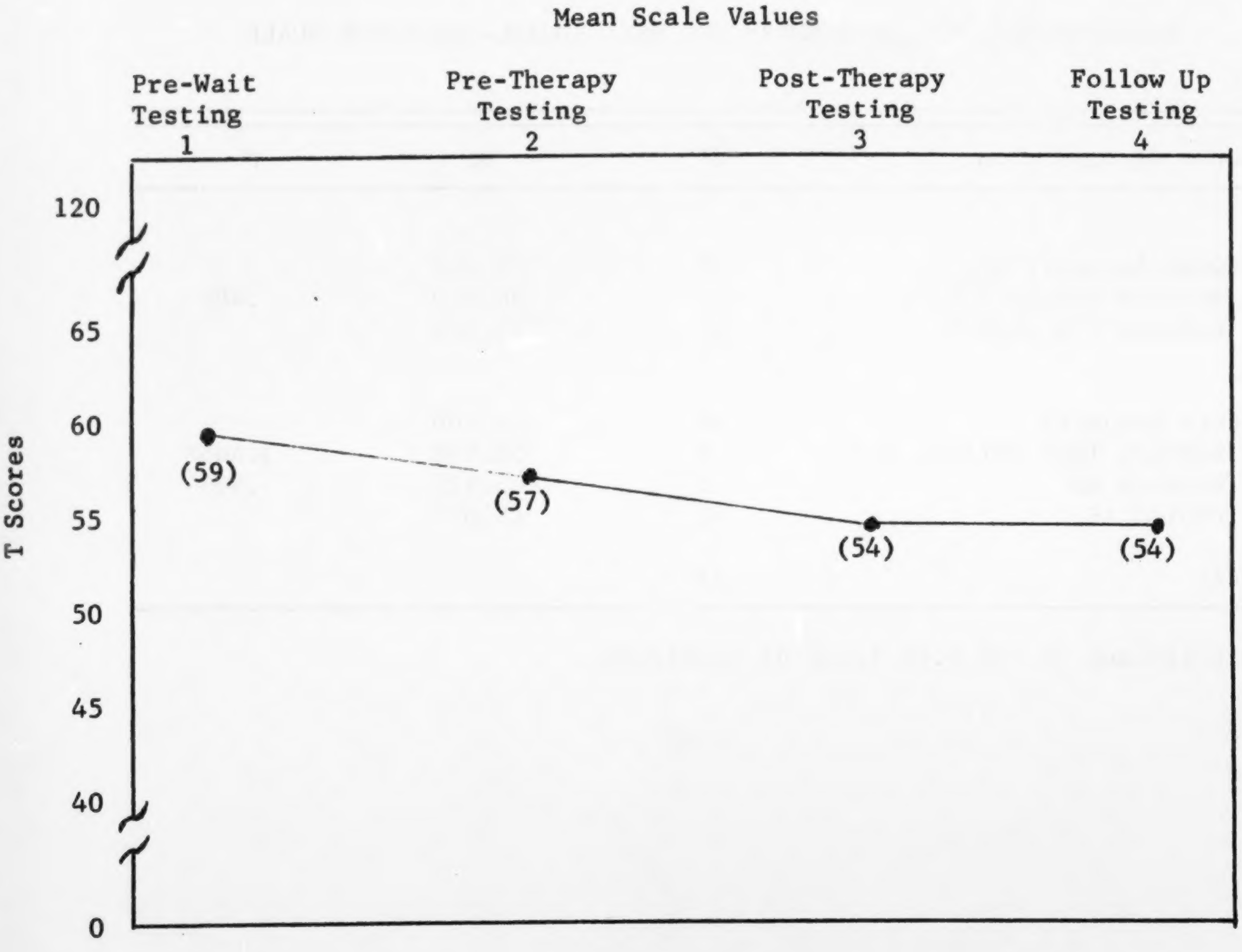

FIGURE 11. COMPARISON OF MEAN SCORES ON PSYCHASTHENIA SCALE (MMPI) OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

## TABLE 18

## ANALYSIS OF VARIANCE SUMMARY FOR MMPI SOCIAL ISOLATION SCALE

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 179.283 | |
| Between Groups (G) | 1 | 90.250 | .486 |
| Between S Within G | 14 | 185.643 | |
| Within Subjects | 48 | 18.260 | |
| Between Test Periods (A) | 3 | 54.958 | 3.465* |
| Between AG | 3 | 15.125 | .953 |
| Pooled AS | 42 | 15.863 | |
| Total | 63 | | |

*Significant at the 0.05 level of confidence.

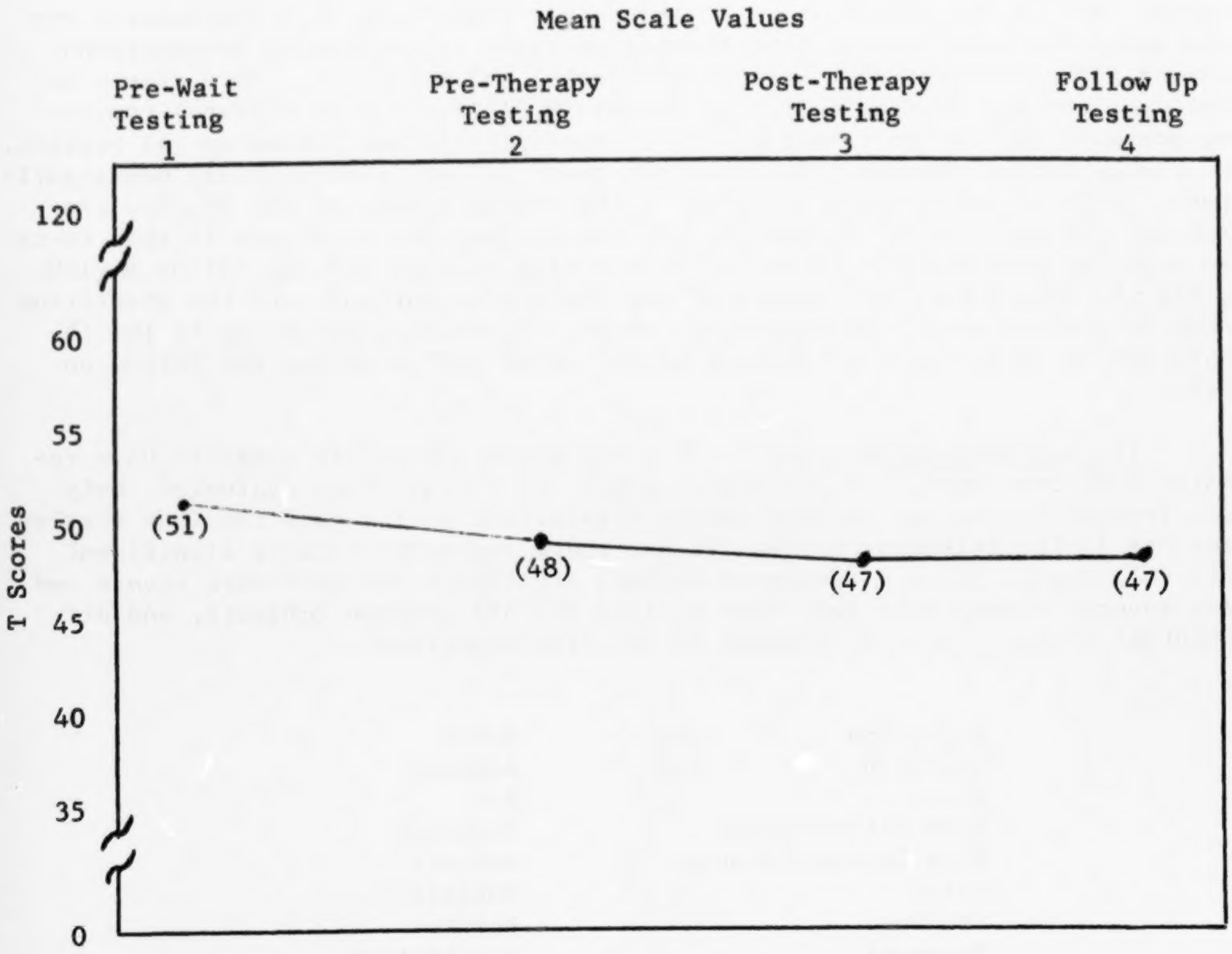

FIGURE 12. COMPARISON OF MEAN SCORES ON SOCIAL ISOLATION SCALE (MMPI) OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

Figure 12 illustrates the changes occurring on this scale. There appears to be a "waiting period effect" which is significant. This is the only occurrence of this on the EPPS and the MMPI. To clarify, there have been trends for effects to begin during the waiting period and to become significant across the waiting and therapy periods (see psychasthenia), but only in this instance does the change reach significance during the waiting or control period. Merely the awareness of having made a commitment to a therapeutic program seems to result in manifest changes in terms of increasing interpersonal contact and consequent decreases in withdrawal and avoidance. This change becomes greater and increasingly significant (0.01 level of confidence) comparing pre-wait (1) and post-therapy (3) or pre-wait (1) and follow up (4) testing. The change during therapy itself was not great and was statistically non-significant. This is interesting in terms of the social nature of the therapy program and the improvement of speech. It can be observed in Figure 12 that there was a slight continuation of this effect during therapy and the follow period. As for the less severe stutterers on the depression variable and the stuttering group as a whole on the psychasthenia scale, the changes occurring in the 18 month period of waiting and therapy appear to be stable during the follow up period.

The Holtzman Inkblot Test - This projective procedure seems to have revealed a minimal amount of meaningful data. Of 22 variables evaluated, only two (reaction time and animal) showed significant shifts over the four testing sessions.[1] The following scales did not yield any statistically significant data relative to group differences between stutterers who were more severe and less severe, change over four test periods for all sixteen subjects, and differential change over time related to severity groupings:

Rejection
Location
Space
Form Definiteness
Form Appropriateness
Color
Shading
Movement
Pathognomic Verbalization
Integration
Human
Anatomy
Sex
Abstract
Anxiety
Hostility
Barrier
Penetration
Balance
Popular

Table 19 shows that the differences in means on the reaction time variable for all sixteen subjects at each of the four test periods (see Within

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[1] Two clinicians -- one a certified clinical psychologist and the other an intern in the Division of Psychology, Northwestern Medical School, evaluated the subjects responses. The reliabilities were all very high and the correlations computed were significant beyond the 0.01 level of confidence. Thus the two raters appeared able to agree on the evaluation of the projective responses. The scores used in the data analysis were those of the more experienced clinician, the certified clinical psychologist.

TABLE 19

ANALYSIS OF VARIANCE SUMMARY FOR HOLTZMAN REACTION TIME

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 2976.867 | |
| Between Groups (G) | 1 | 2889.062 | .968 |
| Between S Within G | 14 | 2983.138 | |
| Within Subjects | 48 | 324.979 | |
| Between Test Periods (A) | 3 | 1364.625 | 5.131** |
| Between AG | 3 | 111.771 | .420 |
| Pooled AS | 42 | 265.948 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

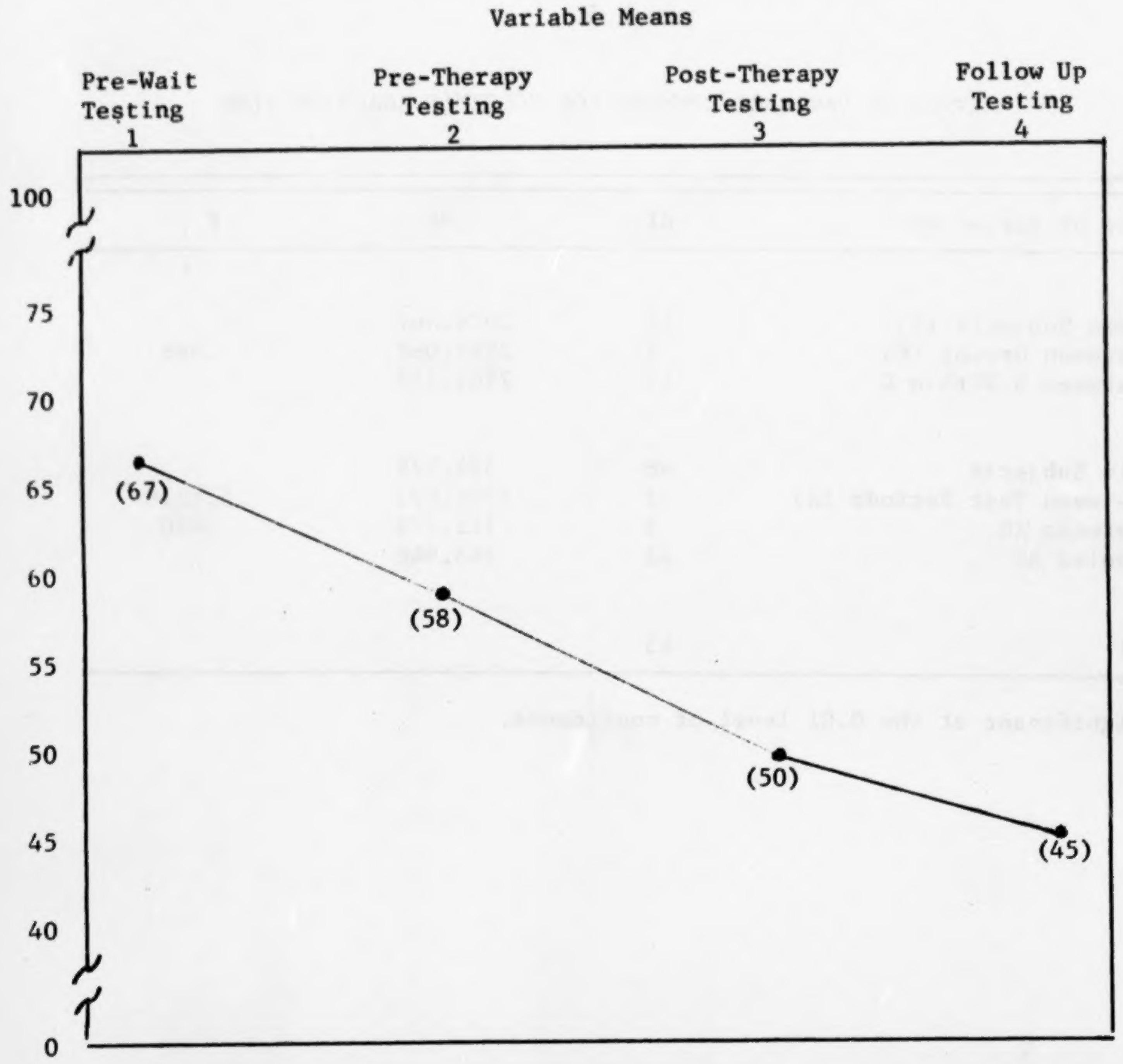


FIGURE 13. COMPARISON OF MEAN SCORES ON REACTION TIME VARIABLE (HOLTZMAN) OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

Subjects, Between Test Periods A) was significant at the 0.01 level of confidence. Figure 13 shows the changes related to this significant result. A t-test comparison of means revelaed the following differences which were significant at the levels of confidence indicated:

1. Pre-therapy (2) and follow up testing (4) - 0.05 level of confidence.
2. Pre-wait (1) and post-therapy testing (3) - 0.01 level of confidence.
3. Pre-wait (1) and follow up testing (4) - 0.01 level of confidence.

The Holtzman reaction time score refers to the average time, in seconds, from the presentation of the inkblots to the beginning of the primary response with spontaneous remarks, asides, and irrelevant comments ignored in determining the interval.

The pattern of reaction time scores (see Figure 13) indicates that the subjects responded more rapidly the more experience they had with the material.

Since, as noted earlier, the Holtzman results did not change (the only other significant change over the entire time of the investigation being on the animal variable which is reported next) during the therapy program and since no two adjacent testing periods were significantly different, one tends to conclude that a learning effect was taking place. At each test period the subjects could recall more responses used at an earlier session. Also, there is a possibility that they were more comfortable each time. The pattern of results do not indicate this was due to therapy. One of the largest percentile differences in reaction time was between pre-wait testing (1) and pre-therapy testing (2).

Animal content on the Holtzman showed a significant variability across the four test periods. This statistically significant difference, which reached the 0.01 level of confidence, was for all sixteen subjects (see Table 20, Within Subjects, Between Test Periods A). There was no differential change related to severity. A t-test comparison of mean values resulted in the following statistically significant differences at the 0.01 level of confidence:

1. Pre-wait (1) and pre-therapy testing (2).
2. Pre-wait (1) and post-therapy testing (3).
3. Pre-wait (1) and follow up testing (4).

Thus, the only significant change between two successive test periods was that between pre-wait (1) and pre-therapy (2) testing. Figure 14 shows this pattern of increase on the animal variable. Just waiting for therapy or knowing therapy was going to begin caused a significant increment in the animal content of the projection. This change which occurred during the waiting period held up afterward for at least the next 18 months.

Animal responses have been associated with stereotyped, superficial, common and mundane qualities. This finding does not seem meaningful with reference to therapy or an assessment of the results of this program of therapy. If this change were to occur during therapy one might speculate that the person was becoming more aware of the routine and mundane as he became aware of and modified his behavior.

TABLE 20

ANALYSIS OF VARIANCE SUMMARY FOR HOLTZMAN ANIMAL

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 2663.796 | |
| Between Groups (G) | 1 | 702.250 | .250 |
| Between S Within G | 14 | 2803.906 | |
| Within Subjects | 48 | 319.875 | |
| Between Test Periods (A) | 3 | 1140.396 | 4.714** |
| Between AG | 3 | 590.750 | 2.442 |
| Pooled AS | 42 | 241.918 | |
| Total | 63 | | |

** Significant at the 0.01 level of confidence.

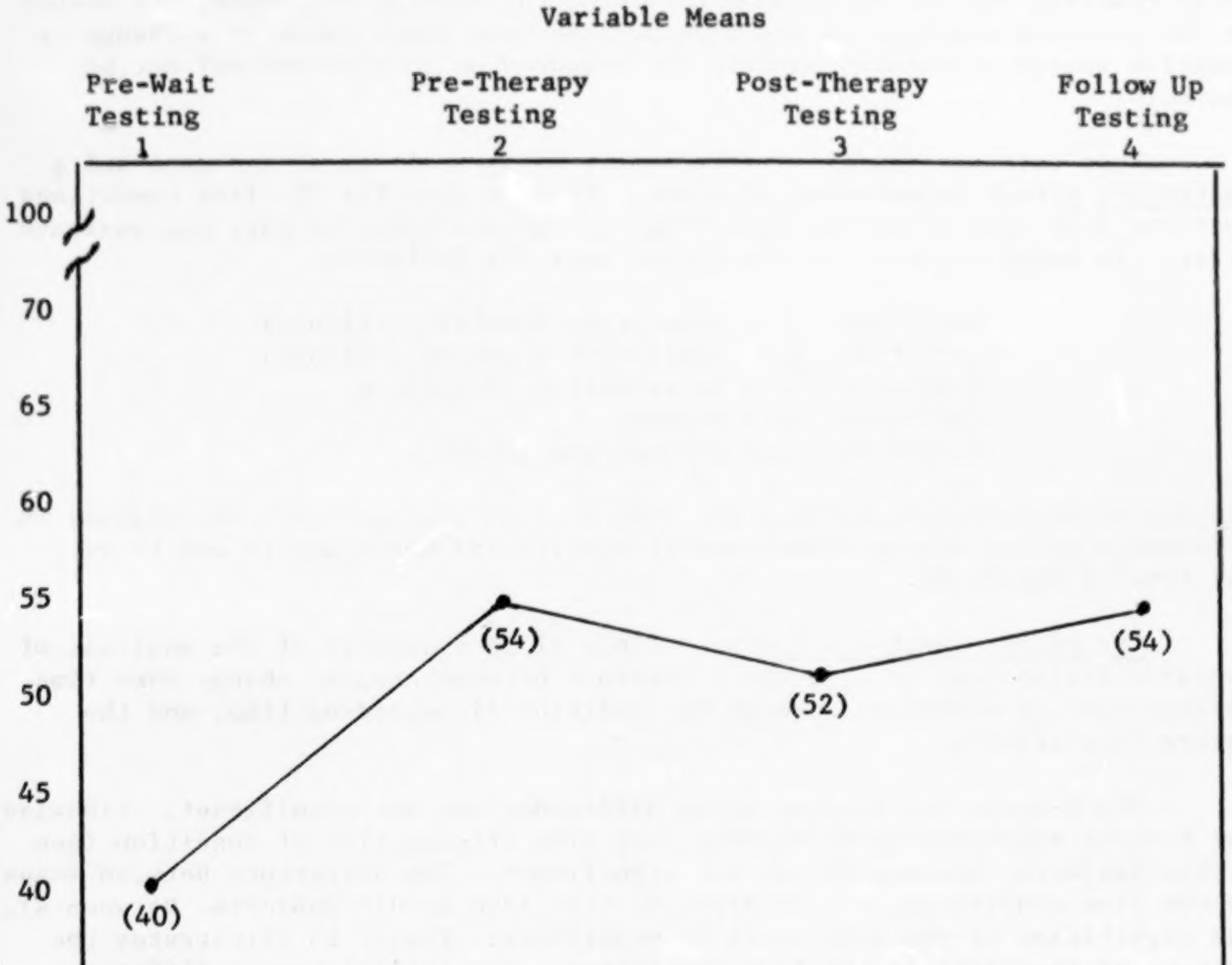


FIGURE 14. COMPARISON OF MEAN SCORES ON ANIMAL VARIABLE (HOLTZMAN) OVER TIME OF STUDY FOR ALL STUTTERERS (N=16).

Palmar Sweat Data

Palmar sweat prints were made at each of four test sessions, following the pattern of testing for the entire study. Prints were obtained during silence before reading to allow adaptation, during anticipation of reading, while reading, and during silence following the reading procedure. As stated in the previous chapter, it was hypothesized that there would be a change in specific speech associated anxiety (as measured by this procedure) during therapy.

This data was studied statistically using analyses of variance and *a posteriori* *t*-test comparisons of means. The raw data for the five conditions over the four test sessions, including the various interactions, was analyzed first. In brief review, the conditions were the following:

Condition I - Adaptation Baseline (silence)
Condition II - Adaptation Baseline (silence)
Condition III - Anticipation of Reading
Condition IV - Reading
Condition V - Resting and silent

The second analysis of variance was done to view statistically the changes in difference scores between Condition II and III and Condition II and IV over the time of the study.

The Palmar Sweat Raw Scores - Table 21 is a summary of the analysis of variance design used to test the difference between groups, change over time irrespective of condition, change by condition disregarding time, and the interaction effects.

The F-score for between group difference was not significant. Likewise, the F-score representing difference over time irrespective of condition (see Within Subjects, between A) was not significant. The difference between means of the five conditions, not considering time (see Within Subjects, Between A), was significant at the 0.01 level of confidence. Figure 15 illustrates the pattern of responses in the five conditions. The following mean differences were significant at the level of significance indicated:

Condition I (Baseline) and Condition III (Anticipation) - 0.01
Condition I (Baseline) and Condition IV (Reading) - 0.05
Condition II (Baseline) and Condition III (Anticipation) - 0.01
Condition II (Baseline) and Condition IV (Reading) - 0.05
Condition III (Anticipation) and Condition V (resting) - 0.01
Condition IV (Reading) and Condition V (Resting) - 0.01

These results appear to support the validity of this procedure since they do show an increase in the operationally defined anxiety during anticipation of reading and actual reading. In addition, there is a return to baseline during the resting period. The statistical analysis supports this observation that there is a return to baseline in that Condition I and Condition V, as well as Condition II and Condition V do not differ significantly.

There was interest in the observed diminution of anxiety between the anticipation condition (III) and the reading condition (IV). It seems that during reading, anxiety decreased. It can be speculated that this means that the dread or anticipation brings about the greater arousal and that once the reading begins, anxiety subsides. This difference approached significance at the 0.05 level of confidence. Thus, even though the trend is worth noting, it cannot be evaluated as meaningful at this time in terms of the statistical criteria for this investigation.

The F-score computed to reveal the possible interaction between differences of conditions and severity (see Within Groups, Between AG in Table 21) was significant at the 0.01 level of confidence. This indicates that the pattern of difference (see Figure 16) varied depending on severity group. The first observation of interest is that the two groups differed significantly at the 0.01 level of confidence on Condition III (anticipation) and Condition IV (reading). In addition, Group I showed a difference between the following conditions which were significant at the 0.01 level of confidence:

Condition I (Baseline) and Condition III (Anticipation)
Condition I (Baseline) and Condition IV (Reading)
Condition II (Baseline) and Condition III (Anticipation)
Condition II (Baseline) and Condition IV (Reading)
Condition III (Anticipation) and Condition V (Resting)
Condition IV (Reading) and Condition V (Resting)

On the other hand, Group II (less severe) showed only one difference between conditions, that between Condition II (Baseline) and Condition III (Anticipation), which approached significance at the 0.05 level of confidence. It seems, therefore, that a large part of the difference across conditions which was found to exist in the overall analysis actually resided in response differences of Group I (more severe). It can be concluded that there is a differential in arousal or anxiety, as sampled by these testing conditions in which Group I shows greater response difference across conditions than does Group II. Since the baseline conditions show stability and responding returns to baseline during the resting and silent period after the anticipation and reading conditions, it seems reasonable to assume that Group I showed greater increase in anxiety or arousal during the anticipation and reading conditions. Again, both groups show a drop in anxiety from the anticipation to the speaking condition, but the differences are not statistically significant.

With reference to the hypothesis that there would be a change during therapy in the specific speech anxiety, the F-scores for Test Periods (see Within Groups, Between H, Table 21) and the Test Periods by Condition (see Within Groups, Between HA, Table 21) interaction were inspected with interest. Both were not statistically significant. Consequently, based on this analysis, it is concluded that responding on the palmar sweat test -- the operational definition of anxiety -- did not not change over the period of therapy.

## TABLE 21

### ANALYSIS OF VARIANCE SUMMARY FOR PALMAR SWEAT RAW SCORES

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 3213.25 | |
| Between Groups (G) | 1 | 2324.71 | .709 |
| Between S Within G | 14 | 3276.72 | |
| Within Subjects | 304 | 314.73 | |
| Between Test Periods (H) | 3 | 1710.34 | 2.109 |
| Between Conditions (A) | 4 | 1980.86 | 8.324** |
| Between HA | 12 | 240.59 | 1.586 |
| Between HG | 3 | 283.24 | .349 |
| Between AG | 4 | 1003.06 | 4.215** |
| Between HAG | 12 | 166.92 | 1.100 |
| Pooled HS | 42 | 810.89 | |
| Pooled AS | 56 | 237.98 | |
| Pooled S(HA) | 168 | 151.71 | |
| Total | 319 | | |

** Significant at the 0.01 level of confidence.

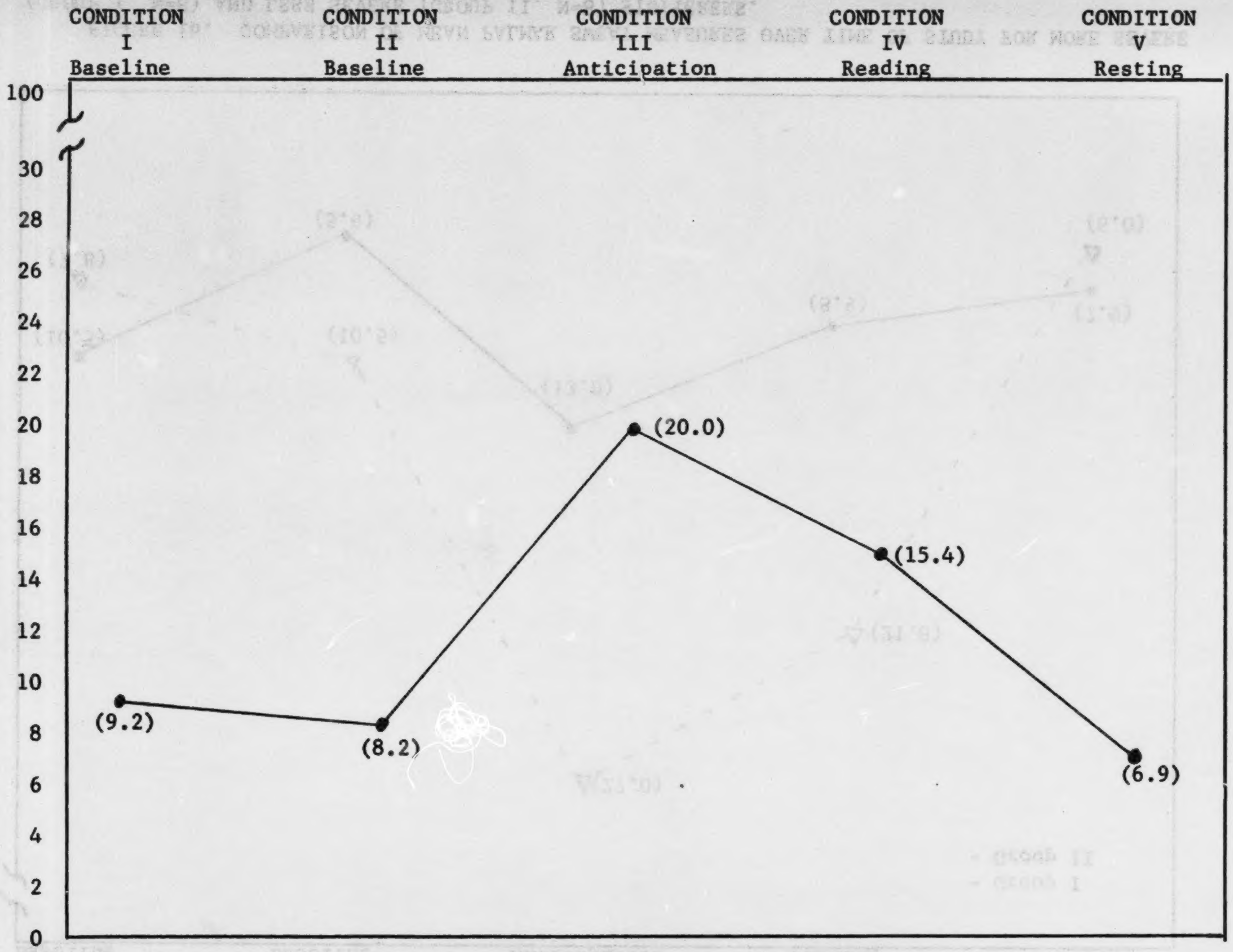


FIGURE 15. COMPARISON OF MEAN PALMAR SWEAT MEASURES FOR ALL TEST SESSIONS AND FOR ALL STUTTERERS (N=16).

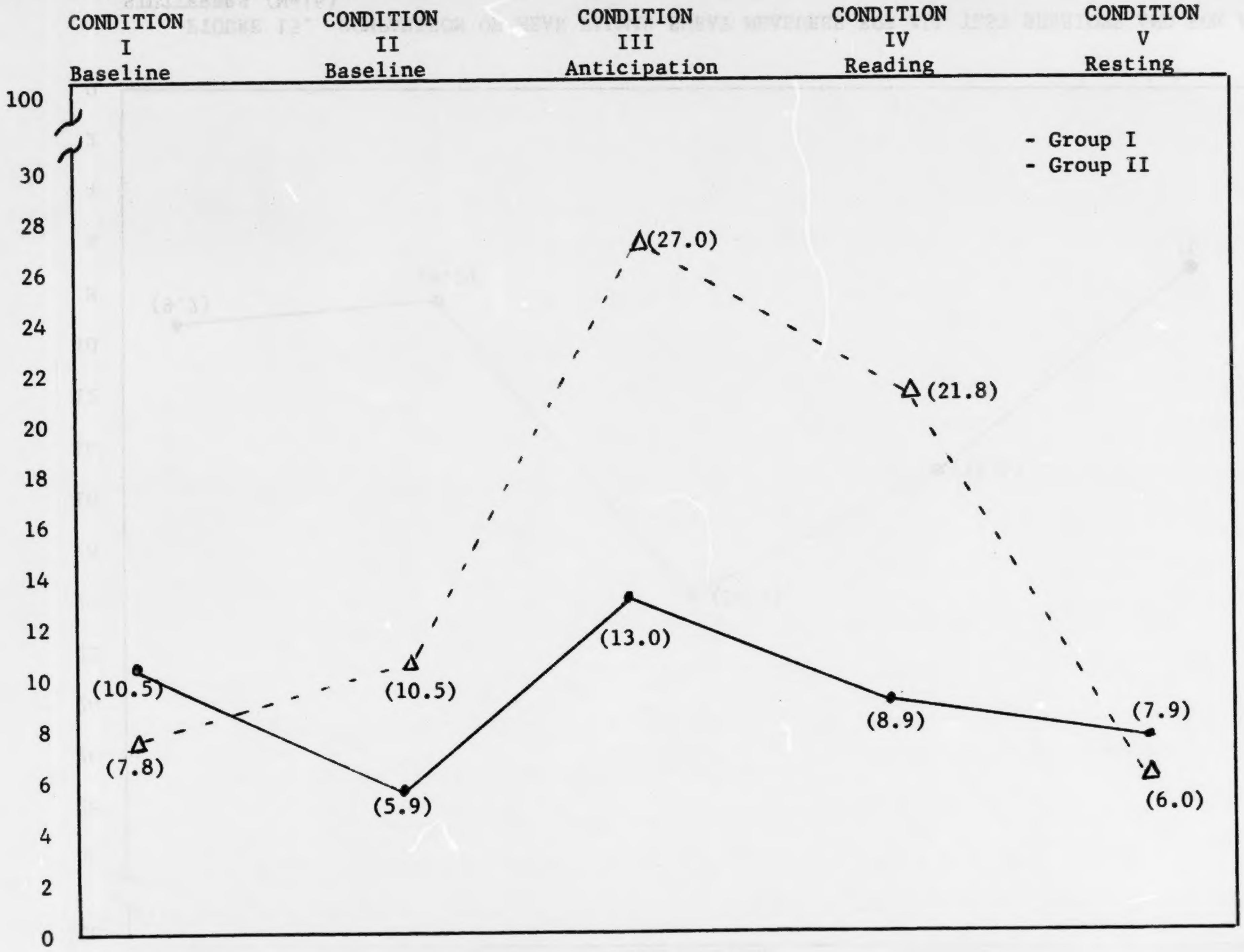


FIGURE 16. COMPARISON OF MEAN PALMAR SWEAT MEASURES OVER TIME OF STUDY FOR MORE SEVERE (GROUP I, N=8) AND LESS SEVERE (GROUP II, N=8) STUTTERERS.

The Palmar Sweat Difference Scores - In this investigation, the major objective in using the palmar sweat procedure was to assess the change in specific speech associated anxiety during therapy. Condition III (Anticipation of Reading) and Condition IV (Reading) were defined as speech associated conditions. Difference scores were computed between Condition II (second baseline) and Condition III and Condition II and Condition IV. In terms of this reasoning, it was thought that a change in these difference scores over the time of therapy represented a change in speech associated anxiety.

The analysis of variance for these palmar sweat difference scores are summarized in Table 22. The F-score resulting from the test of between group difference in the difference scores was significant at the 0.05 level of confidence. The mean of all of the difference scores for Group I was -13.8 and for Group II -5.3. A minus score means an increase in anxiety during reading. This shows that Group I (more severe) had a greater increase in anxiety during the anticipation of reading and reading than did Group II (less severe). In the previous section, it was shown that the two groups differed significantly at the 0.01 level of confidence on Conditions III and IV: therefore, this finding was expected.

Table 22 also indicates that the difference between the means of the two difference scores (see Within Subjects, Between A), disregarding time and group, was significant at the 0.05 level of confidence. The means for the two difference scores were as follows:

Difference between Conditions II and III = -11.8
Difference between Conditions II and IV = - 7.2

Again a minus mean score represents an increase in anxiety. This is interpreted as meaning that there was significantly less anxiety during reading as compared to the anticipation of reading when both of these conditions are compared against the same baseline. It was seen in the previous section that the difference between Condition III (anticipation) and Condition IV (reading) approached significance at the 0.05 level of confidence. It was speculated that the decrease between Condition III and Condition IV indictated that anticipation or dread brought about a greater increase in anxiety than did actual reading. The present finding of a significant difference in difference scores -- the reading condition being less than the anticipation condition -- strengthens the conclusion that there is less anxiety during reading than during the anticipation of reading which immediately precedes reading. Observation of Table 22 shows that the interaction between the two difference conditions and severity (see Within Subjects, Between AG) was not significant.

It was hypothesized in this study that therapy would bring about a change in these difference scores. The F-scores for Test Periods (see Within Subjects, Between H) and the Test Periods by Condition Interaction (see Within Subjects, Between HA) were not significant. Consequently, it was concluded from the analysis of difference scores, as it was in the case of the raw data analysis, that responding on the palmar sweat test did not change over the period of therapy. Based on the assumptions underlying the use of this procedure as a definition of speech associated anxiety, it cannot be said that

## TABLE 22

## ANALYSIS OF VARIANCE SUMMARY FOR PALMAR SWEAT DIFFERENCE SCORES

| Source of Variation | df | MS | F |
|---|---|---|---|
| Between Subjects (S) | 15 | 573.51 | |
| Between Groups (G) | 1 | 2323.92 | 5.182* |
| Between S Within G | 14 | 448.48 | |
| Within Subjects | 112 | 235.20 | |
| Between Test Periods (H) | 3 | 342.42 | 1.216 |
| Between Conditions (A) | 1 | 679.88 | 6.051* |
| Between HA | 3 | 437.84 | 2.325 |
| Between HG | 3 | 408.57 | 1.451 |
| Between AG | 1 | 22.95 | .204 |
| Between HAG | 3 | 254.00 | 1.349 |
| Pooled HS | 42 | 281.63 | |
| Pooled AS | 14 | 112.36 | |
| Pooled S(HA) | 42 | 188.33 | |
| Total | 127 | | |

* Significant at the 0.05 level of confidence.

this therapy brings about a change in this dimension of physiological responding.

Prognostic Indicators of Speech Change

The best predictors of improvement in speech (decreased stuttering) during the therapy program being evaluated were the pre-therapy ratings of the severity of stuttering while speaking or reading. The Pearson Product Moment Correlations between the individual ratings of stuttering severity during speaking, reading, and for the derived combined speaking-reading scale value as measured at the pre-therapy testing session, and improvement are shown in Table 23. In each instance the more severe the stuttering before therapy, the greater the improvement expected during therapy. This information agrees with the previously reported data showing that the more severe group of stutterers made greater improvement than the less severe group.

Only one personality variable, the MF (masculine-feminine) scale of the MMPI correlated with improvement. There was a correlation of .50 between the MF scale and improvement in speech (significant at the 0.05 level of confidence). The correlation between the MF scale and improvement in reading was not significant. When the one female in the study was eliminated from the analysis the correlation between the MF scale score and improvement in speaking was lowered and was then statistically non-significant. Therefore, it was concluded that no importance can be connected at this time to MF scale values as being prognostic of speech improvement. It may be that persons with the more passive qualities, represented by higher scores on this scale, do respond better to the type of direction from the therapist and procedures for modifying speech behavior used in this therapy program. This should be studied further.

## TABLE 23

### CORRELATION COEFFICIENTS BETWEEN PRE-THERAPY RATINGS AND IMPROVEMENT DURING THERAPY

| Type of Pre-Therapy Rating | Improvement | | |
|---|---|---|---|
| | Speaking | Reading | Speaking-Reading Combined |
| Speaking | .78** | .61** | .73** |
| Reading | .57* | .80** | .76** |
| Speaking-Reading Combined | .72** | .76** | .79** |

* Significant at the 0.05 level of confidence
** Significant at the 0.01 level of confidence

# CHAPTER IV

# DISCUSSION OF RESULTS

The purpose here will be to summarize the findings of this investigation and to discuss the meaning of these results as they are understood at present.

## Stuttering Behavior

In terms of the own-control research design employed and the objective of comparing a therapy period with a control period, the first important observation made was that the severity of stuttering appeared to remain stable during the waiting period. Viewing all sixteen subjects as one group, the ratings of stuttering severity indicated a substantial and statistically significant reduction in stuttering during the therapy period. There was a slight regression in the positive effects of therapy during the follow up period. However, the positive change in stuttering behavior over the 18 month period of therapy and follow up was significant.

These findings show that therapy was effective; however, two outcomes indicate that additional therapy was needed. In the first place, the mean ratings of stuttering severity (see Table 5) at the post-therapy and follow up testing sessions reveal that the group is still showing a mean rating which is characteristic of mild to moderate stuttering. Secondly, there was the tendency toward regression during the follow up period. On the basis of this data it is concluded that stuttering therapy for adults utilizing the approach being evaluated should be for an extended term, perhaps twice as long as the nine-month period of this study, and that therapy should be planned to terminate gradually.

When the results of the therapy program were assessed taking severity into consideration it was found that Group I (the more severe) appeared to follow the same pattern of change as that of the combined sample, but that Group II (the less severe) did not show a statistically significant change over time. Table 6 and Figures 2, 3, and 4 show the data being discussed. Again, the baselines obtained over the waiting period show that the stuttering behavior was quite stable when the subjects were not in therapy and the random variables of life were operating. There was a differential in change related to severity in that Group I showed a substantial and statistically significant (0.01 level of confidence) reduction in the severity of stuttering but Group II, while moving in the direction of improvement, did not show a statistically significant change. Group II, however, did not show the group trend toward regression during the follow up period as did Group I. Even though the direction of change in Group II during the therapy period and the follow up period was toward improvement, the change never reached statistical significance.

This analysis taking severity into consideration suggests, as we previously noted in discussion of the total group, that a long term of therapy would improve results. Group I especially needs to make further improvement in speech which it is assumed would be brought about by a continuing of therapy. In addition, the slight relapse by Group I during the follow up period reveals the need for further treatment and a more gradual termination. It can be said that Group II also needs further treatment assuming that the trend toward improvement would continue. On the other hand, the findings for Group II may imply that the therapy is not the most appropriate or being managed in such a way as to make it maximally effective. In the author's more recent work with stutterers he has extended his work in the therapeutic area of building up a new psychomotor speech pattern (Description of Therapy Program, Chapter II, this report and Gregory, 1968) using delayed auditory feedback and other approaches to blending and motor speech planning (Frick 1965) to instate and to more thoroughly condition a smoother speech pattern. The less severe stutterers would probably have shown a significant change if this approach had been emphasized more. It is concluded that results on change in speech behavior in both groups indicate that along with work on attitudes and the diminishing of fear and avoidance behavior, greater emphasis needs to be placed on activities described in this study as building up new psychomotor speech patterns and patterns of behavior.[1] In addition, it is postulated that all of these stutterers, but Group I in particular, may have just reached the point in treatment where maladaptive attitudes and more overt unadaptive behavior were reduced to the point that more constructive developments were highly probable. It has been this author's opinion that therapy for adult stutterers is often terminated when considerable progress has occurred, but at a time when patterns of change were not firmly conditioned or generalized. This points up the importance of an approach such as the one employed by Sheehan (1965) of graduating stutterers to a carry-over or terminal group when the most significant aspects of therapy have been covered successfuly. Behavior such as stuttering which involves many cues to anxiety in so many complex forms would be expected to be difficult to decondition (Gregory 1968, Luper 1968, Shames and Sherrick 1963). In a symposium on "Principles of Learning and the Management of Stuttering" at Northwestern University 1965, the various contributors stressed that greater attention needs to be given to the planning of situations which bring about greater generalization of behavior acquired in the clinic to outside, real life situations.

In addition to this need for longer term therapy and work on stimulus control or generalization, it is recommended that therapeutic techniques can be made more effective by utilizing more appropriate reinforcers and by adopting procedures which utilize continuous and intermittant reinforcement schedules in a more systematic way (Brookshire 1967, Holland 1967). Laboratory

[1] See also Gregory (1968).

results indicate that these considerations, which were dealt with only in a general way in this study, will increase the effects of stuttering therapy. Learning theory as well as the author's experience indicate that more concentrated therapy at certain times during the process of treatment improves the effectiveness of therapy.

Before concluding this discussion of speech change, two observations should be made which have a bearing on the measured results. The reading and speaking tasks (see Chapter II) were planned to be as realistic as possible and to confront the stutterer with a task that would accurately test his ability to generalize behavior. In other words, with the possible exception of the reading to one person task, therapy was not intended to train the person to perform the criterion task. The point being made here can always be questioned, but every attempt was made to make the criterion measurements representative of an average real-life situation and not a situation that the person had rehearsed extensively in the clinic. Finally, since the stutterers were using voluntary stuttering at the end of therapy it may be that this lessened the improvement observed using the severity ratings.

## Reactions to Speaking Situations and Attitude Toward Stuttering

The subjects' responses on the Reactions to Speaking Situations Scale (Johnson et al 1963, Shumak 1955) a self-report procedure, revealed a decrease in avoidance, more enjoyment of speaking, and a decrease of self-reported stuttering as an outcome of therapy. These changes were statistically significant when the mean ratings for all 16 stutterers at each of the four test periods were considered. There was no significant change during the waiting period. Moreover, the positive changes occurring in therapy were maintained during the follow up period. These changes were not related to severity as were the shifts in rated speech behavior. Evidently, the less severe group's behavior and accompanying feelings about speaking situations changed in the same manner and degree as the more severe group when what the person says about his behavior is considered. Likewise, the stutterers as a group (N=16), with no differential effect related to severity, showed a significantly better attitude after therapy as evaluated on the Iowa Scale of Attitude Toward Stuttering. Thus, in another way the subjects' self-reports indicate a positive change. Based on these findings, and when considered in relation to findings on speech behavior ratings by reliable panels of listeners, it is concluded that the less severe group evaluated their progress in therapy as meaningful even though the rated changes in speech behavior -- while showing a trend toward improvement -- were not significant.

## Personality

On the Edwards Personal Preference Schedule, significant results occurred on the order, succorance, and abasement variables -- three of a total of sixteen variables in the schedule.

There was a differential change on the order variable related to severity. During therapy the more severe group (Group I) showed a significant increase in the trait of orderliness. This dimension of personality returned to the pre-therapy level during a nine-month follow up period. It seems, therefore, that in the more severe group, which also showed a significant improvement in speech, this therapy program with its emphasis on an analysis and modifications of behavior increased the tested orderliness and organization of the stutterers. By way of discussion, one might say that since this change parallels speech change it is a result to be appreciated and sought in stuttering therapy. Also, it is reasonable in terms of this therapy program's emphasis on analysis, scrutiny, and modification of behavior to expect this. A general return of this characteristic to the pre-therapy level nine months after therapy indicates that speech change can be maintained without a prolonged change on the order variable. Group II (less severe) which did not show a significant change on this measure during therapy showed a non-significant improvement in speech. It can be speculated that the less severe stutterers cannot respond appropriately in terms of becoming more structured. If we accept the idea that this is desirable in therapy, it may be that more effective procedures are needed to bring this about in the less severe stutterers. A more carefully programmed therapy in which the clinician organizes more precisely a step-by-step procedure might produce better results.

For the abasement variable, there was no significant change during therapy: however, for the group of stutterers as a whole (N=16) there was a significant decrease in abasement from the pre-therapy testing session to the follow up testing. In other words, the statistically significant change took place over the 18 month period of therapy and follow up. Furthermore, the interaction effect was almost significant indicating that most of the change in abasement was in Group II (less severe). This group showed a non-significant trend toward speech improvement during therapy. Apparently, a decrease in abasement does accompany speech improvement and continues to occur after therapy. This finding is in agreement with the rather well accepted objective in stuttering therapy of helping the stutterer have a more hopeful, optimistic outlook.

These adult stutterers as a heterogeneous group (based on severity) became less succorant during therapy and maintained the change afterward. Edwards (1959) describes a decrease on the succorance variable of the EPPS as indicating less dependence and less need for sympathy or having a "fuss made over."

A general conclusion from the EPPS results is that improvement in speech is accompanied by personality changes which include being less self debasing and less in need of succorance or aid, help, and assistance. In addition, a change toward more orderliness of general functioning appears to accompany improvement in speech.

The analysis of the MMPI data revealed statistically significant findings on the depression, psychasthenia, and social isolation scales. The significant finding on the depression scale was the change between pre-wait and post-therapy testing for Group II (less severe stutterers). Depression, as measured here, apparently begins to decrease as the person anticipates entering a therapy program. This improvement, is of course welcomed, but it cannot be said to be due directly to the therapy program since the significant change occurred in the 18 month period including the waiting period and the therapy period. Nevertheless, it seems reasonable to have some confidence in the statement that the therapy program contributed to a lessening of depression and a more optimistic feeling in Group II. This is of somewhat greater interest when considered along side the change in Group II toward less abasement as measured by the EPPS.

A similar change to that on the depression scale occurs on the psychasthenia scale, but this time the change is significant for all sixteen subjects as a group and is not differentiated by severity. Therapy per se does not appear to have a significant impact on the characteristic assessed on this scale, but there was a diminution of phobic behavior, excessive worry -- some of the personality traits measured by the scale -- during the waiting and actual therapy period combined.

On the social isolation scale of the MMPI there was a statistically significant "waiting period effect." This is the only time this occurred on the EPPS or MMPI. On the depression and the psychasthenia scales, trends toward certain effects began during the waiting period and became significant during the therapy period, but only in the case of the social isolation scale does the change reach significance during the waiting or control period. However, the change on the social isolation scale continues and becomes more significant during therapy, i.e. comparing pre-wait test and post-therapy test results.

All of these positive changes on the MMPI scales began during the waiting period and continued during therapy. The changes occurring in the eighteen month period of waiting and therapy remained stable during the follow up period.

These results from the MMPI indicate that the expectation of help can be as strong a factor in bringing about changes on some dimensions of personality as therapy itself. However, these changes continue in the same positive direction during therapy. Furthermore, it seems that these changes have no unique effect on speech since speech change did not occur during the waiting period.

The findings from the Holtzman Inkblot Test were interpreted as having very littel significance. The reaction time decrease across time appears to be due to learning more than anything else. It might have been related to the decrease in stuttering if it were not for the fact that the trend toward shorter reaction time began in a rather prominent, although not statistically significant, way during the waiting period. Likewise, as of now, no important meaning can be attached to the increased animal content of the Holtzman projections. As Figure 14 shows, most of this increase took place during the waiting period and then became stable for the therapy and follow up periods.

One final conclusion should be noted relating to the personality data. It seems that stuttering behavior can be modified, and in some instances a statistically significant amount, without changing many personality traits among those measured by the EPPS, the MMPI, and the Holtzman Inkblot Technique. There were no instances in which the stuttering therapy produced a group change toward poorer adjustment as measured by these personality inventories.

## Specific Speech Anxiety (The Palmar Sweat Data)

Palmar sweat prints during silence, anticipation of reading and reading were obtained to test the hypothesis that there would be a change in specific speech associated anxiety as a result of therapy. Analysis of the palmar sweat raw scores and the difference scores representing changes from baseline to anticipation of reading and baseline to reading did not indicate that this stuttering therapy brings about a change in this physiological response which was operationally defined as representing anxiety. Evidently speech change can take place over a period of time without a concommitant change in the palmar sweat measures.

The configuration of the palmar sweat scores showing an increase in palmar sweating during the anticipation of reading and reading which was statistically significant when compared to baseline measures and then a return to baseline during the resting period following reading tends to support the validity of this procedure. To the extent one accepts this method for measuring arousal or anxiety, there is interest in the finding that there was a differential in response in which Group I (more severe) shows greater response differences across conditions than does Group II (less severe). Group I showed a greater increase in anxiety during the anticipation and reading conditions. Consequently, increase in anxiety seems to be related to severity. Group I made a greater change in speech without making at the same time a change in anxiety increment during anticipation of reading and reading. Possibly, a change in speech precedes this change in physiological responding which takes effect after a longer period of time. A person attempting to modify or change some aspect of behavior may remain quite aroused or anxious for a period of time even though the success he is experiencing may eventually lead to a lessening of arousal or anxiety. Another speculation is that methods for more directly deconditioning speech associated anxiety need to be added to this therapy. The recent reports of Gray (1969) using reciprocal inhibition therapy is of interest in this regard.

Lastly, there was a trend for anxiety to decrease from the anticipation condition to actual reading. A comparison of difference scores revealed a statistically significant difference between baseline-anticipation and baseline-reading. Apparently anxiety was decreased as soon as the stutterer began reading. This finding may be related to Johnson's premise (Johnson 1956) that anxiety deconfirmation explains the adaptation effect in stuttering. Johnson speculated that the stutterer did not find the act of speaking or stuttering as threatening as expected; thus, he stuttered less from reading to reading of the same passage.

General Anxiety (The Taylor Manifest Anxiety Scale)

The palmar sweat scores, just discussed, pertained to speech associated situational anxiety. Another hypothesis of this study was that general or trait anxiety, as measured by the Taylor Manifist Anxiety scale, would be changed by this therapy. The lack of change in manifest anxiety during therapy indicates that speech changes without a concomitant change in this characteristic. Thus, there is no change in speech associated anxiety as measured by palmar sweat prints or general trait anxiety as indicated on the Taylor Scale which accompanies speech change. On the other hand, the therapy program should be re-evaluated to see if it can be made more effective by including procedures which bring about change in general and specific anxiety. The absence of change in these factors could be related to the previously discussed length of the therapy program. It is possible that over a longer period of time there would be greater change on many dimensions including speech behavior, personality functioning, and these anxiety characteristics.

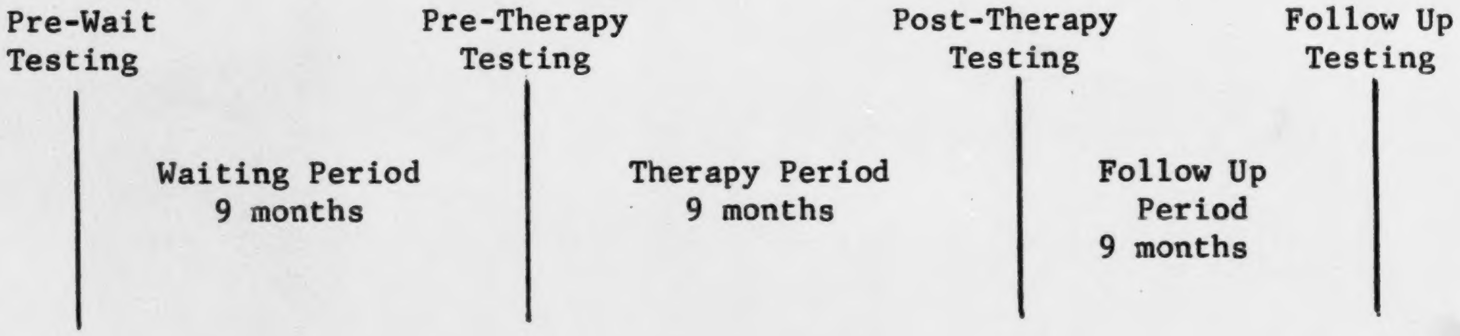
# CHAPTER V

## SUMMARY AND CONCLUSIONS

This study was undertaken to assess the outcome of stuttering therapy for adults when a carefully delineated approach was utilized. In addition to an evaluation of changes in stuttering behavior per se, changes in several psychological, behavioral, and physiological characteristics were investigated. Another purpose was to evaluate the therapy group after a follow up period to measure the degree to which changes occurring in therapy were maintained. A related objective was to obtain information about changes in speech behavior as related to certain subject variables.

The approach to stuttering therapy employed in the investigation was essentially an avoidance reduction, anxiety reduction therapy system, based principally on concepts of learning theory psychology which have been described over the years by Bryngelson (1950), Johnson (1956), Sheehan (1958), and Van Riper (1963). The specific goals and techniques of the therapy program were described with reference to four main areas of therapeutic activity. These goals and techniques were adhered to with considerable uniformity, although the emphasis on a specific activity was varied slightly from client to client. Rigidity was avoided but the clinicians remained agreed throughout the program that they were carrying out essentially the same course of treatment for each client. The subjects were seen for therapy two evenings a week, receiving one hour of individual therapy and one hour of group therapy each evening.

A research design was used in which the subjects served as their own controls. Evaluations and measurements of the therapy groups were made nine months before therapy began, again at the end of this "waiting period" before therapy was initiated, at the end of the therapy period, and nine months after the close of therapy. The design is sketched below:



Seventeen adult stutterers constituted the experimental group. It was originally planned to have two groups of ten subjects each, but three subjects dropped out of the program during the waiting period or just after therapy began. Therefore, one therapy group contained eight subjects and the other nine. For the purpose of data analysis and the reporting of results the total number of subjects were pooled and then divided into a more severe group (Group I, N=8) and a less severe group (Group II, N=8). The subject falling at the median of the composite ratings of speaking and reading was dropped from the analysis to equalize the number of subjects in the two groups.

The results and conclusions will be summarized with reference to each of the hypotheses evaluated in the study:

Hypothesis No. 1. There will be a change in the severity of stuttering behavior in terms of severity ratings of the tape recordings of reading and speaking samples. Viewing all sixteen subjects as one group, there was a substantial and statistically significant reduction in stuttering during the therapy period. Severity of stuttering appeared stable during the waiting period. There was a slight regression in the positive effects of therapy during the follow up period. Nevertheless, the positive change in speech behavior over the 18 month period of therapy and follow up was significant. When the results of the therapy program were assessed taking severity into consideration, it was found that Group I (more severe) followed the same pattern of change as the combined sample, but that Group II (less severe) did not show a statistically significant change. Group II did show a trend toward improvement during therapy which continued during the follow up period; whereas, Group I which showed a significant improvement during therapy regressed slightly during the nine months following formal treatment.

Both the analysis of the sample as a whole (N=16) and observation of the results taking severity into consideration indicate that a longer term of treatment with a more gradual termination of therapy would improve results. With reference to Group II, the findings imply that the therapy is not the most appropriate or being managed in such a way as to make it maximally effective. It was advocated that more work be done on instating a new psychomotor speech pattern as part of a total approach to the adult stutterer's problem. In addition, it was suggested that greater attention be given to the planning of situations which bring about greater generalization of behavior acquired in the clinic to outside, real life situations. Finally, it was recommended that therapeutic techniques relating to all of the goals of therapy can be made more effective by programming activities more precisely. There is a need to be more specific in our application of learning principles. In summary, the results pertaining to stuttering behavior confirm that stuttering is being reduced successfully, but indicate certain changes should be instituted to make therapy more efficient and to insure longer lasting results.

Hypothesis No. 2. There will be a change in the amount of avoidance of speaking situations as measured by the Stutterer's Self-Ratings of Reactions to Speech Situations Scale. There were statistically significant decreases in self-reported avoidance behavior during the therapy program. The positive changes in avoidance were maintained during the follow up period. Other results from the Self-Ratings of Reactions to Speech Situations Scale indicated an increase in the enjoyment of speech and a decrease in self-reported stuttering as an outcome of therapy. These changes were not related to severity as were the shifts in listener rated speech behavior. Thus, the less severe group, which did not make a statistically significant shift in stuttering severity as rated by listeners, evaluated their own progress in therapy as meaningful and beneficial.

Hypothesis No. 3. There will be a change in attitude toward stuttering as measured by the Iowa Scale of Attitude Toward Stuttering. The stutterers as a group (N=16), with no differential in effect related to severity, showed a significantly better attitude after therapy. This finding, along with those from the Reaction to Speech Situations Scale, shows that all of the stutterers as one group (N=16) make certain changes in attitude and reaction to speaking situations which paralleled speech behavior change as rated by listeners. The differential effect of severity does not appear to be present as it was for the change in severity ratings. It seems that the stutterers, especially the less severe, rate their own change as more positive than the severity ratings by listeners indicate.

Hypothesis No. 4. There will be a change in certain characteristics of the stutterer's personality, as assessed by the Holtzman Inkblot Test, the Minnesota Multiphasic Personality Inventory (MMPI) and the Edwards Personal Preference Schedule (EPPS). A general conclusion from the results of the EPPS is that improvement in speech behavior is accompanied by personality changes which include being less self debasing and less in need of succorance or aid, help, and assistance. In addition, a change toward more orderliness of general functioning appears to accompany a positive change in speech. The differential effect of severity on change in the order variable was related to the therapy program's emphasis on analysis and modification of behavior. It was speculated that the more severe stutterers, who made a significant change on this variable and speech, were better able to organize themselves and modify their behavior. It was suggested that a more carefully programmed therapy might produce better results in the less severe stutterers, and of course, the more severe stutterers also.

The analysis of the MMPI data revealed statistically significant results on the depression, psychasthenia, and social isolation scales. The change in depression was significant for the less severe group only. All of these positive changes on the MMPI scales began during the waiting period and continued during therapy. These findings indicate that the expectation of help can be as strong a factor in bringing about changes on some dimensions of personality as therapy itself. Also, these changes seem to have no unique effect on speech since speech change did not occur during the waiting period before therapy.

The findings from the Holtzman Inkblot Technique were interpreted as having practically no significant meaning.

Another general conclusion was that stuttering behavior can be modified, and in some instances a statistically significant amount, without changing many of the personality traits measured by the EPPS, the MMPI, and the Holtzman. The more psychodynamically oriented therapist may argue that more emphasis on personality change would make stuttering therapy more effective. On the other hand, in terms of the point of view that stuttering is a symptom of personal maladjustment, it is interesting to note that there were no instances in which the stuttering therapy produced a group change toward poorer adjustment.

Hypothesis No. 5. There will be a change in specific speech-associated anxiety as measured by palmar sweat prints. Analysis of the palmar sweat raw scores and the difference scores representing changes from baseline to anticipation of reading and baseline to reading did not indicate that this stuttering therapy brings about a change in this physiological response which was operationally defined as representing anxiety. It was speculated that a change in speech, i.e. decreased stuttering, may precede the diminishing of physiological arousal which takes effect after a longer period of time. Possibly, this finding is also indicative that a longer term of therapy is needed. Another speculation is that methods for more directly deconditioning speech associated anxiety need to be added to this therapy.

Hypothesis No. 6. There will be a change in general anxiety as measured by the Taylor Manifest Anxiety Scale. The positive changes in speech behavior found to result from this stuttering therapy program were not accompanied by a change in general anxiety. It may be that speech change can occur without a change in trait anxiety. On the other hand, it is possible that the therapy program may be made more effective by including more general counselling or other such approaches which serve to reduce general anxiety. Another hypothesis which has been stated a number of times in the discussion of this study may also apply here. A longer period of therapy may bring about a greater change on many dimensions evaluated including speech behavior, personality, and these general anxiety characteristics.

Prognostic Indicators - Considering all of the speech, personality, and behavioral variables measured in this study, it was found that the best predictor of improvement in speech was more severe stuttering at the beginning of therapy. This information agrees with the data showing that the more severe group of stutterers made a significant change in speech: whereas, the less severe group made a non-significant improvement. This finding is of little value as a prognostic indicator of therapeutic improvement. It is interpreted as meaning that therapy for less severe stutterers needs to be made more effective.

# APPENDIX I

## CASE REPORTS [1]

In the preceding chapters the results of the study have been analyzed statistically and presented with reference to the outcome of therapy with a more severe group and a less severe group of stutterers. Although the principal purpose of this project was to demonstrate an approach to the gathering of meaningful statistics on the results of stuttering therapy and to add to the minimal amount of this type of data now available, the presentation of two case reports should prove beneficial in reemphasizing the complexity of the therapeutic process with individuals. In other words, although group data are valuable in indicating general patterns of change which occur in therapy and in suggesting general modifications in approach, speech therapy for stutterers is still a matter of responding to individuals. The following descriptions of cases who, by the criterion of maintenance of speech improvement during the follow up period, were regarded as "successes" or "failures" demonstrate more realistically the nature of the therapeutic process. Furthermore, these descriptions show how the study of cases indicates variables needing investigation.

### A Clinical Success: Cora

Cora was a 23-year-old Negro female of large build, semi-neatly groomed and with the potential of being an attractive person. She was employed by a stock broker as an editor of consultation reports. Her ambition was to be a teacher. She holds a B.A. degree in English.

The history revealed that she had grown up in Alabama. At age 2 she was sent to live with her maternal grandparents. The parents, according to Cora, were having difficulty and wanted "to get rid of the product of their union." She had no relationship with her parents. The subject reported that her grandfather was a loving person, but that her grandmother resented the fact that "I represented the dream of what she had put into her last child." Our initial impression of Cora was that she was distant and somewhat angry toward her family, her employer, men, and the environment in which she had been reared. She described herself as growing up alone. Our earliest impression was that to do something successful with a group meant a great deal to her, but she had a very high estimation of what was "success." "Success" probably meant being "the best." She verbalized her resentment that the environment in which she was reared was not as perfect as it should be.

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[1] These reports were first published by the Speech Foundation of America (1968). All information pertaining to the subjects' identities have been changed.

Cora was a moderately severe stutterer. She manifested some severely tonic blocks, especially on bilabial sounds, that lasted as long as seven seconds. Articulation was slurred, and she rambled as she spoke -- both characteristics were thought to be secondary manifestations of stuttering. She blocked on most of the consonant sounds and often on medial and final syllables. There were contortions of the face, squinting of the eyes, and very poor eye contact. Her eyes would water as she spoke. During speech she said her head "was hot." In summary, Cora was very anxious and tense as she spoke.

The client related that the grandmother recalled the subject began stuttering at 9 years of age when Cora entered a "new room at school."

Cora was seen two hours a week in individual therapy and two hours a week in group therapy for 9 months. Therapy began with a case history. During these discussion oriented interviews, the clinician's objective was to establish an atmosphere in which the client would feel that we were interested in her as a person and wanted to understand her problem as well as we could. Such questions were discussed as the following: What do you think caused your problem? What have you been told will help stutterers? What have you done for your stuttering?

The same topics were pursued in the group sessions in which there were nine other stutterers. The clinician rewarded the clients' contributions by repeating them at the beginning of subsequent sessions or by asking them to share a certain observation with the others in the group.

Cora expressed the opinion that many people believe stuttering is associated with a lack of intelligence -- that when the stutterer gets stuck or substitutes a word, it is due to a limited vocabulary. This revealed something about Cora's concept pertaining to listeners' reactions as contrasted with other stutterers who report people telling them that stutterers are more intelligent -- that they must have a large vocabulary to substitute so frequently. Other information of this type came out; and after hearing herself on the tape recorder at the second session, she said, "I sound much more literate and don't block nearly as long as I thought."

The emerging picture of her self-concept was interesting. She had a "superior" manner in a way, very high standards for herself, and felt that she never quite measured up as she should. This was interpreted as a compensation for the way she felt about her background of being reared in a low socio-economic environment and of being rejected by her parents and grandmother.

It was important for this client to find in therapy an opportunity to explore her feelings about her previous life experiences. Her therapist in individual sessions was a person who could listen well and offer appropriate comments which reinforced her thoughtful statements. Her clinician was also effective in providing interpretations which did not frighten the client during the early stages of therapy.

She revealed that she had undergone psychotherapy for three months, two years before. Testing done at that time showed that she was capable and had aptitude scores that coincided with people in the fields of English and philosophy. Cora said she was learning to "accept some things" about herself and that she was beginning to see that she "should not feel sorry for herself." Although she did not continue this counselling, it seemed to us that she had gained from this experience by being reassured about her ability and by being directed to an appraisal of her self-evaluations.

Following a discussion of the possible ways in which stuttering develops and the development of secondary symptoms, the client and the clinician worked together in analyzing and labelling the client's stuttering behavior. Mirror work and tape recordings were used in this process. Negative practice (imitating actual secondary manifestations) was used in the individual sessions. Cora began to realize what she was doing when she interrupted the speech flow or "stuttered." For example, she observed what she called a "double stuttering block" in which the tension would begin at one place of articulation and spread to another. The clinician was careful to give her support during this phase of therapy. She was told that she should expect to feel a little more anxious at this time in therapy and that actually her stuttering might seem somewhat worse as she forced herself to face it rather than concealing it as previously. The clinicians rewarded all of the clients for being willing to go ahead and talk regardless of their difficulty, and most especially they were rewarded for analyzing their speech behavior. Gradually, the idea was getting through to Cora that stuttering wasn't something that just happened, but it was the exaggerated pursing of the mouth, the dialating of the nostrils, the tensing of the jaw, etc., that she did when she talked. Furthermore, in doing the negative practice, the client began to see that she could modify and change the stuttering pattern.

The subject was taught relaxation procedures using Jacobson's progressive and differential method.

She was given the following rationale:

1. In order to relieve the tension which you have observed in the speech mechanism, you must learn to be aware of the state of tension in the small and large muscle groups throughout the body.

2. Thinking of and striving for increased relaxation when under stress will provide a competing response which will help you be more calm.

She was encouraged to compare the tense and relaxed state of her arm during the relaxation exercise with the tense and less tense condition of her lips during speech. She was shown other ways that she could modify her speech response -- voluntary stuttering (bounce, slide). Clinicians in the program used voluntary stuttering and Cora teased her clinician about using the "uh" vowel after ever consonant such as saying "bu bu bu" in "busy."

As work progressed on speech modifications, the clinician provided leads and opportunities for the client to explore her attitudes and feelings. A more hopeful attitude toward being able to change her speech seemed to result in Cora being less anxious and tense at this time when speaking, and perhaps less anxious generally. She seemed to recognize, however, that she needed to spend clinical time exploring her attitudes and feelings toward herself and others.

Cora felt that her immediate supervisor where she worked was very perfectionistic. She said she avoided him "because he has admiration for articulate people and is intolerant of imperfection." This reference led to a more thorough consideration of the roots of her perfectionistic attitude. She expressed the idea that her perfectionistic attitude was related to her hostile feelings toward her family whom she saw as being so imperfect. As a direct result of these conversations, Cora decided on a course of action which included telling her supervisor about the stuttering program.

Cora's eye contact was much improved at this time and she was using voluntary stuttering in situations outside the clinic. When using the bounce pattern, she often went out of control on the second bounce. She said this happened because she was fearful of the listener's impatience. The clinician discussed the possibility that she was projecting her own impatience and perfection into the listener. At this time (the end of three months of therapy), Cora was beginning to use many new verbal labels, e.g., "projection," "rationalization," and "inferior feelings." She was exploring some interesting thoughts such as: "I felt incompetent and unequal and stuttering became the whipping boy of all the feelings of inadequacy," "I have never known a person who was perfect."

She labelled as rationalization her refusals to go to meetings of her college alumni organization because "I don't like the way the organization is run." She went to one meeting and had so much trouble introducing herself that she never returned.

Cora seemed to begin making discriminations concerning attitudes learned as a child and generalized to adulthood ("I'm surprised a grownup can be so fearful."). She was talking more to friends about her attitudes and this was interpreted as a generalization of behavior learned in the clinic. Friends told her she was much too serious and sensitive.

Cora was feeling increasingly good about her new speech pattern as she used cancellations, pull-outs, and new preparatory sets. She worked on phrasing, increased oral activity (she had a tendency not to open her mouth sufficiently, resulting in slurred speech), inflection, etc. She reported the changed speech pattern was beginning to come naturally. In talking with a male friend about her stuttering and the reason why she would not go into teaching, she found this friend was not "impressed" by her stuttering problem and did not see why it should prevent her from being a teacher.

In the group, she shared these thoughts and experiences freely and became admired by the others. This was very important reinforcement.

She reported enjoying humor and small talk with other women at work. For example, she had a "small talk" conversation with one woman at a coffee machine and this person came to talk with the client two more times that day.

The sessions during the last month of therapy were directed toward working out a plan for Cora to be her own therapist. In the group she said, "I plan to enter each speaking situation with techniques I've learned at the clinic, and, hopefully, they will become a habit. I plan to continually evaluate performance." Her motto was "you experience, you reflect, you evaluate, and you change."

Shortly after leaving therapy, Cora took a position teaching English in an industrial training school. She thought this would be good for her as the students there would not be as great a challenge as those students in a regular academic program. She succeeded in the industrial school, and, one year later, she was appointed to a position in a large city school district.

At our last "reunion meeting," Cora appeared thrilled and happy with her present life situation. Her communication was very pleasant and adequate. The few stuttering blocks which she had were very mild and of a nature that would probably not be observed by a listener not aware that she had a problem.

Psychological Commentary Prepared by Staff Psychologist - Intellectually, Cora functions in the average range, though this appears reduced from her optimal intellectual capacity as a function of a significant depressive quality and a concommitant reduction in response time. There is a certain impulsivity (sic) that is used in an effort to avoid the ruminative aspects and the unproductive features associated with the depression.

Prior to the speech therapy, we note an intense agitation in handling the projective materials. There is a dysphoric quality, a tendency to be somewhat labile emotionally, and an immature tendency that fails to come to terms with mature needs and impulses. She is afraid of interpersonal relationships and tends to be isolated and introversive.

Immediately following the speech therapy, we find a marked diminution in the hysterical and hypochondriacal qualities present in this woman and a reduction in the depression from a highly significant level to, at most, one of moderate extent. She is considerably less socially isolated and considerably more able to deal with the aggressive motives that are characteristic of adult interactions.

After the speech program, Cora seemed somewhat more introversive, but considerable less overwhelmed by the necessity to maintain obsessive and compulsive defenses which should make her day-to-day functioning meaningfully more efficient.

Concluding Comments - The therapeutic relationship was important in this client's success. Cora was able to identify with the clinician who was a female of about the same age. Both of them were rather tall women. Cora enjoyed being with the clinician. Subsequently, as therapy proceeded, the client adopted the clinician's calm attitude of considering several possible ways of interpreting experiences and memories. The matching of client and clinician was very important in Cora's progress. In addition, as she found it possible to discuss her opinions and feelings with her clinicians and the members of the group (her speech was improving as she learned modifications) this more open and comfortable attitude generalized to situations outside the clinic. As mentioned in the previous discussion, Cora was able to discover some of the things people thought about her at the present rather than generalizing from earlier experiences. Of course, it cannot be overlooked that the process occurring was an interaction between the clearing up of misevaluations and the possibility that the people in Cora's environment were reacting to her differently as change in her social attitudes and speech behavior occurred.

The reinforcement from the group was also important to Cora, and it seemed that her progress might not have been as great in another group in which there may have been a different reaction to her as a person. As research in psychotherapy (Murray, 1968) has indicated, the effects of reinforcement are closely related to the relationship in therapy. I think that Cora's progress in all of the different areas of therapy including change of attitude and reduction of fear and avoidance behavior was greatly influenced by the relationship she had with the invidivual clinician, the group clinician, and her fellow clients.

Cora brought to therapy an analytic, rational attitude toward problems related to her work, and we were able to manage therapy so that she applied this problem solving attitude to herself.

## A Clinical Failure: Fred

Fred was an 18-year-old, white male, short and muscular in physique, who was a freshman in college. The first impression was that he looked insecure and childish and walked and moved in a way that was immature. He sat in a stiff, tense posture, with the head usually tilted to one side. He lived at home with his mother and father. Fred stated that his father was unable to work due to poor physical health.

The client was a severe stutterer (oftentimes he blocked on every other word in conversational speech). He stuttered mostly on initial sounds, but there was also blocking on medial and final syllables of words. He displayed considerable tension of the lips, tongue, jaw, and larynx as he spoke. Starters such as "uh," "wa wa wa," and "well uh" were used frequently. A gasping type inhalation was involved in approximately one of every three blocks.

Breaking through a speech block was sometimes accompanied by a slight leg movement. Fluent words, or occasional fluent phrases, were spoken in a slow, labored rate. The lack of motor facility of the speech mechanism was apparent even before an oral examination was done. The same general quality of incoordination appeared to characterize all of Fred's body movements (hand movements, walking, etc.).

Diadochokinetic rates of the tongue were slow. There was improvement of diadochokinetic rates as the examination progressed from tongue tip, to lingua velar, to laryngeal level. "Kah Luh" was easier for him to do than was "Tuh Kah." Tongue tip movements improved when the jaw was stabilized. There was considerable deterioration in the precision of articulation when the rate of producing "Puh Tuh Kuh" was increased. Reversals of "Kuh" and "Tuh" occured on "Puh Tuh Kuh." There was a slight extensor thrust movement of the tongue when the rate of tongue lateralization was increased. One point and two point sensory discrimination of the face and tongue appeared normal.

Fred said that he had stuttered as long as he could remember. Fred's mother recalled that the subject's speech development was slow -- first words at about two years -- still not using good sentences when he went to kindergarten. (According to mother, the subject walked alone at 11 months.) The interview with the mother also revealed that the client had speech therapy in the first grade and then "off and on when it was available." The mother reported that she had been a stutterer but that she had stopped stuttering when 18 years of age. However, observation of the mother revealed mild to moderate stuttering characterized mainly by rapid repetitions and prolongations of vowels.

Fred was seen two hours a week in individual therapy and two hours a week in group sessions for nine months. Therapy began with a case history. During these discussion oriented interviews, the clinician's objective was to establish an atmosphere in which the client would feel that we were interested in him as a person and wanted to understand his problem. Such questions were discussed as the following: What do you think caused your problem? What have you been told will help stutterers? What have you done for your stuttering?

These same topics were discussed in the group sessions. Fred brought out the possibility of heredity as a cause because he said his mother had told him she stuttered until she was 18. Although Fred was the youngest client in the group of ten, he contributed freely. On several occasions he brought up topics which led to fruitful discussions. For example, he stated that all non-fluency was stuttering. This resulted in a discussion of people's fluency in general and whether or not others who were disfluent had the same feeling, i.e., fear, related to it, as does a stutterer. Some ideas offered by Fred were : "Person may lose eye contact because he is embarrassed." When talking about relaxation, he said to the group, "I think you have to think relaxed." When talking about speech fluency, he said, "Maybe every child is at one time non-fluent, and if a child notices this non-fluency the child begins to avoid it." These points are mentioned because in the staffings there was discussion among the clinicians about the value of the content of the client's statements and attitude when talking in the group. He seemed to be enjoying the group a great deal. He would "grab" an opportunity to correct one of the other client's statements. The individual clinician was of the opinion that these statements, such as the above quotes, represented a repeating of what others said. The clinician was concerned that Fred showed very little ability to integrate ideas and to reason. It was apparent that to some extent the other clients were amused and, perhaps, annoyed at times with the "childish glee" which seemed present when these comments were made.

The decision was made in staffing that the clinician would discuss the purpose of the group and the importance of thinking about a contribution before hand -- is it adding to the discussion, is it monopolizing the discussion? After this, it was observed that the client began to daydream in the group just as he had been observed to do in individual sessions. Evidently, we increased anxiety and brought about this behavior which was his way of coping with frustration and conflict. Consequently, we questioned our approach. We speculated that it would have been wiser to let the group reaction develop, as we have done on other occasions, and then in individual therapy help him explore the reasons for the group reaction and his feelings about it. Possibly, the immaturity aspect, as contrasted with the more frequently encountered hostile or "know it all" attitude, was what misled us. We had a need to tell "the little boy" too soon. We had recognized that one of our principal goals with Fred was to help him develop the use of his higher mental processes, but we did not adopt a strategy that would shape the kind of thinking of which he was then capable (as represented by his verbalizations) into the kind of thinking we perceived he needed to do.

The first meeting of the group at which the clients were asked to bring a relative or friend was held toward the close of two months of therapy. The client was encouraged to bring his mother in keeping with the belief that those in the client's environment needed to know what was transpiring in therapy and, furthermore, that they needed to know what changes in behavior to reinforce. The client's mother was verbose and domineering. Although it was not expected that the clients would have shared much of what was occurring at the clinic with those at home at this early stage of therapy, it was apparent after this meeting that Fred had not told his mother anything about the group and that, furthermore, he never did talk with her about himself unless she urged him to do so. The mother attempted, within the range of the subject's hearing, to tell us about her son's "emotional problems." She related that he laughed when he shouldn't, that he jumped up and got excited while watching TV, paced the floor, etc. At the next individual session, the client said, "My mother talked to you about what she called emotional problems, and I would like to talk about these things for a few minutes." He said that his daydreaming bothered his mother and then said, "I can't figure out if this is right or wrong." He went on the point out that "what bothers her is she talks to me, and I may not hear her." He told how he liked to fantasy that he was a coach and that in his room at home he would talk out loud to the team. (Fred's one success in life appeared to be his cross country running, and he wanted to major in physical education and be an athletic coach). He said he enjoyed this fantasy and thought it all right in his room.

Two months later after another visit by the mother to the clinic the client said of his parents, "They don't care how my speech gets better. They just want it to get better." Later, he said, "There is a personality conflict between my parents. You see they don't like each other. First time my father threw something was when I was seven years old. Last August was the last time, and since a son shouldn't beat up his father . . ." In addition, the mother refers to the fellows who participate in cross country running as "animals." He described this home situation as causing his tension.

We saw clearly now that we could not expect support from the client's home. In fact, the wisdom of trying to explain any of the therapy procedure to the mother was questioned. These visits to the group by the mother helped us to understand the client's previous learning environment and present situation, but we speculated that it might have been better to interview the mother privately and make some determination of our therapeutic strategy as to whether or not to involve her in therapy process. The question arises as to whether it is advisable for a parent like this to be involved at all, thinking she is informed when she is not able to cooperate constructively. This client's situation made us reconsider carefully this aspect of our approach to therapy.

Meanwhile, therapeutic activities aimed at analyzing and modifying Fred's avoidance behaviors (secondary symptoms) were underway. The clinician hoped to relate self-awareness of speech to awareness of self in general. Negative practice (imitating actual stuttering pattern) was used in the individual sessions. Fred began to realize what he was doing when the speech flow was interrupted. The mirror and tape recorder were used as Fred learned to watch his stuttering pattern and listen to those auditory aspects such as starters. Negative practice began with work on the starters, head jerks, and the gasping patterns of breathing. He was very pleased to be able to demonstrate some of the negative practice in the group. Relaxation procedures were taught.

Fred was very cooperative in carrying out the suggested modification procedures, such as the slide, bounce, and delayed response. Progress as compared to the others in the group was considered satisfactory. However, he demonstrated very little ability to evaluate a speech response or procedure and to generalize from one specific act of speech modification to another. He had difficulty using a variety of modifications and, thus, getting a feeling of being able to do first one thing and then another with his speech. We worked on improving the motor activity of the tongue and integrated this with the work on making a smooth transition in voluntary stuttering.

The client's speech at the clinic was improved considerably after six months of therapy, and he reported successes in using modification outside the clinic. A regression was observed after his mother's second visit to the clinic. Fred also reported that he was feeling apathetic. He attributed this feeling to not having competed in a race for four months (as mentioned previously this appeared to be his only real accomplishment) and having stuttered "just as bad as before in talking to a teacher."

In the continuing discussion of his attitudes and feelings the daydreaming was interpreted as being, in part, that type of activity in which all people indulge, and, in part, a way of coping with the frustration he felt about his speech and the situation at home. Other "adjustment mechanisms" such as rationalization and compensation were discussed in the group and individual sessions, but the use of these labels in his thinking came very slowly.

As the nine month therapy program came to a close, Fred was feeling rather good about his new speech pattern. He was using pull-outs and preparatory sets. He thought that work on phrasing had been particularly helpful. During the mother's last visit to the clinic, the clinician attempted to commend Fred's good work in studying and modifying his speech. The mother winked at the clinician and said, "You deserve all the credit."

The client's mother called me four months after the end of therapy, when Fred was due home from college for a visit, to say he would like a conference with me. The mother said, "He is stuttering terribly." Fred called my home when I was away and when I returned, my daughter said, "Some little boy who stutters very badly called you." I saw Fred and heard his report that he was having considerable trouble in all situations. Even though he stuttered rather severely, the gasping inhalation which was a part of the pattern before therapy was not observed. Fred said he was thinking that he should not stay away at school. One reason given for this was that his cross country running was not as good, and he thought he might lose his scholarship, but in addition, he thought his mother would rather have him at home.

Psychological Commentary by Staff Psychologist - Though Fred has completed at least two years of a college program, we note that on the Wechsler Adult Intelligence Scale he obtains a Full-Scale IQ score of only 97. He is functioning on the tests at a level well below what might be considered his optimal intellectual capacity, for we find a highly significant variability on the individual subtests in which he misses quite easy items while answering correctly much more difficult material with relative ease. He is highly pedantic and quite rigid in his use of the intellectual ability, showing no flexibility or ease in calling forth the potential. He deals with the tasks as if quite unable to evaluate the adequacy of his own functioning as a result of the constricting and impovershing defenses.

On the projective tests administered immediately prior to the speech therapy program, Fred shows profound feelings of inadequacy, inferiority and worthlessness. In completing the heading on the test form, he writes "boy" in the space for sex. There is a profoundly depressive quality that is avoided full conscious recognition by the investment of quite massive amounts of energy in terms of repressive defenses. It is this quality that we see revealed on the intellectual material as resulting in a notable impotence and impoverishment in the utilization of the intellectual potential. In relationships with people, Fred, during the pre-therapy period, seems obsequious, self-demeaning, and self-derogating. There is a significant passive-dependent quality in the character structure.

Upon the completion of the speech therapy program, we find meaningful psychological changes, some enhancing the negative self-concept, some showing an attempt to make changes in overt behavior, as if attempting to change what he realizes is inappropriate and self-defeating behavior. For example, the negative traits regarding feelings of worthlessness and inadequacy are significantly enhanced after the therapy program, as if Fred has become aware of the full impact of these attributes in the psychological organization. Concommitantly, we see increments in his desires to achieve and in a certain aggressiveness in day-to-day activities. These positive qualities account for the reduction in the marked depression that was present pre-therapy, but considerably less so after the speech program; the aggressive and hard-driving qualities also account for the reduction in the fear of interpersonal relationships.

Concluding Comments - There were many significant factors operating in Fred's stuttering problem:

We were able to identify organic components of the problem portrayed in his generally poor motor coordination and the specific deficits in the motor control of the tongue, lips, and laryngeal valving mechanism. The psychosocial factors were of such great magnitude to require a long term program of psychotherapy. We became increasingly aware of this as therapy continued. We will continue to follow Fred, and, hopefully, additional speech therapy, combined with a psychotherapy program, can be arranged.

It is speculated that the client's therapeutic experience could have been better if we had been more accepting of his contributions to the group early in therapy -- attaching more importance to the positive experience it was for him to be able to talk in a group and say what he pleased. We talk about the importance of this in counterconditioning and anxiety reduction, but we did not react as appropriately as we should in this situation. It is our impression that his intelligence (WAIS I.Q. 97) combined with his environmental experiences which have not encouraged maturity limited his ability to evaluate himself and his social behavior.

We have questioned the advisability of placing Fred in this group. It may be that a pattern of therapy in which he would have received individual therapy only at first, followed by a group therapy after it was seen that he could profit from and contribute to the group process would have been a more successful approach.

I think we should have evaluated the parental environmental influences differently. The home environment was assessed at the time we brought the mother into the group situation to give her information about the therapeutic process. In some adult situations, of which the present client's may be illustrative, we may want to control carefully the information the parents or spouses have about therapy. Fred's main work in therapy may have to be to learn to react differently to the environment rather than hoping that along with his change there will be change in environmental factors.

Finally, the psychological commentary indicates that some constructive personality changes did occur. At my last conference with Fred (nine months after therapy ended) he was able, during a one hour interview, to begin modifying his speech behavior fairly well, once again, although he stuttered severely at the beginning of the hour. Consequently, the prognosis now, as compared to before therapy, is somewhat better.

# APPENDIX II

## INSTRUCTIONS TO SUBJECTS AND LISTENERS

### EXPERIMENTAL CONDITION AND PROCEDURE FOR READING TO ONE PERSON

#### Instructions to Subject

"In room ____ there is one person. You are to enter the room and take a seat across the table from that person. You will be given a copy of a printed passage which you should read as you ordinarily would. The person in the room will tell you when to read by saying 'You may begin to read.' After you have finished, give the passage back to the person and return to this room. Any questions?"

#### Instructions to Listener

When the subject enters the room, look at him with a pleasant expression, but avoid a smile. When the subject is seated, hand him the passage and tell him to begin reading by saying, "You may begin to read." When he has finished, he has been instructed to give the passage back to you and to return to room ____.

### EXPERIMENTAL CONDITION AND PROCEDURE FOR READING TO FIVE PEOPLE

#### Instructions to the Subject

"In room _____, there are five people. You are to enter the room and stand behind the table. When one of the people in the room tells you, "You may begin", you are to pick up the copy of the printed passage, which you will find on the table, and read it as you ordinarily would. After you have finished, return the passage to the table, and come back to this room. Any questions?"

#### Instructions to the Listeners

When the subject enters the room, look at him with a pleasant expression, but avoid a smile. When the subject is standing behind the table, Miss _______ will tell him to begin reading by saying, "You may begin to read". When he has finished, he has been instructed to return the passage to the table and to return to room _____.

## EXPERIMENTAL CONDITION AND PROCEDURE FOR SPEAKING JOB TASK TO ONE PERSON

### Intructions to Subject

"You are to go into room _____, introduce yourself, and take a seat across the table from the one person in the room. He (or she) will ask you some questions and tell you what you are to talk about. After you have finished, you will be told to return to this room. Any questions?"

### Instructions to Listener

"Hello, I'm _______." (Give subject chance to introduce himself.) "Please be seated. I would like you to talk for three minutes or so about your job, or your possible future job or vocation. Describe the job or vocation, tell me why you have chosen it, and anything else about it you wish to tell. Take a minute or so to think about what you want to say, if you wish."
If the person stops before the end of 4 minutes of actual speaking time, encourage him by means of leading statements, such as:

'Please tell me about that.'
'Describe it in more detail.'

If, at the end of 4 minutes, the subject seems to want to continue in order to complete his thought on the subject or because of his difficulty speaking, allow him to continue until he comes to an appropriate place for you to say, 'Thank you, you may go back to room _____.' "

## EXPERIMENTAL CONDITION AND PROCEDURE FOR SPEAKING JOB TASK TO FIVE PEOPLE

### Instructions to the Subject

"In room _____, there are five people. You are to enter the room, stand behind the table, and tell about your job for three minutes or so. Describe your job or vocation, tell why you have chosen it, and anything else about it you wish to tell. Take a minute or so to think about what you want to say, if you wish. If you have trouble thinking of something to say, one of the people in the room will ask you a question. After you have finished, you will be told to return to this room. Any questions?"

### Instructions to the Listeners

A subject will come into the room with instructions to stand behind the table and tell you about his job. If he has any trouble finding something to tell about for at least four minutes of actual speaking time, Miss _______ will encourage him by making leading statements, such as:

'Please tell about that.'
'Describe it in more detail.'

If at the end of four minutes of actual speaking time, the subject seems to want to continue in order to complete his thought on the subject, allow him to continue until he comes to an appropriate place for Miss _______ to say, "Thank you, you may go back to room _____."

# APPENDIX III

## DATA FOR INDIVIDUAL SUBJECTS

**IN ALL OF THE FOLLOWING TABLES LISTING RATINGS AND SCORES FOR EACH SUBJECT, THE SUBJECTS COMPRISING SEVERITY GROUPS I AND II ARE AS FOLLOWS:**

| | **SEVERITY GROUP I (MORE SEVERE)** | | **SEVERITY GROUP II (LESS SEVERE)** |
|---|---|---|---|
| **SUBJECT NO.** | **1** | **SUBJECT NO.** | **3** |
| | **6** | | **4** |
| | **9** | | **5** |
| | **10** | | **7** |
| | **11** | | **8** |
| | **13** | | **12** |
| | **14** | | **15** |
| | **16** | | **17** |

**Note that Subject No. 2 was ommitted from the division of subjects into severity groups to equalize the N of the groups. Subject No. 2 was at the median of the severity distribution.**

## TABLE 24

## WECHSLER ADULT INTELLIGENCE SCALE DATA

### INTELLIGENCE TEST SCORES AT PRE-WAIT TEST SESSION

| Subject No. | VERBAL I.Q. | PERFORMANCE I.Q. | FULL SCALE I.Q. |
|---|---|---|---|
| 1 | 118 | 116 | 118 |
| 2 | 92 | 96 | 93 |
| 3 | 104 | 89 | 98 |
| 4 | 112 | 89 | 102 |
| 5 | 115 | 116 | 116 |
| 6 | 120 | 147 | 133 |
| 7 | 97 | 107 | 102 |
| 8 | 114 | 101 | 109 |
| 9 | 115 | 108 | 113 |
| 10 | 99 | 108 | 103 |
| 11 | 124 | 134 | 130 |
| 12 | 121 | 98 | 112 |
| 13 | 95 | 101 | 97 |
| 14 | 107 | 101 | 104 |
| 15 | 121 | 115 | 119 |
| 16 | 110 | 103 | 107 |
| 17 | 114 | 114 | 115 |

## TABLE 25

## RATINGS OF STUTTERING BEHAVIOR

### MEAN RATINGS FOR SPEAKING, READING, AND SPEAKING-READING COMBINED FOR EACH OF FOUR TEST SESSIONS

| Subject No. | SPEAKING | | | | READING | | | | SPEAKING-READING COMBINED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 5.60 | 5.60 | 2.20 | 2.80 | 4.92 | 4.80 | 1.28 | 1.20 | 5.26 | 5.20 | 1.74 | 2.00 |
| 2 | 2.55 | 3.00 | 2.03 | 1.65 | 6.85 | 7.15 | 2.65 | 1.43 | 4.70 | 5.08 | 2.34 | 1.54 |
| 3 | 6.55 | 5.00 | 4.13 | 3.25 | 4.85 | 4.05 | 4.73 | 4.45 | 5.75 | 4.53 | 4.43 | 3.85 |
| 4 | 3.15 | 4.48 | 3.60 | 4.03 | 4.35 | 5.10 | 3.45 | 3.05 | 3.75 | 4.79 | 2.53 | 3.54 |
| 5 | 3.20 | 3.45 | 2.25 | 1.60 | 3.87 | 2.93 | 2.83 | 1.70 | 3.54 | 3.19 | 2.54 | 1.65 |
| 6 | 6.10 | 4.35 | 3.05 | 3.35 | 7.25 | 7.43 | 3.68 | 3.15 | 6.68 | 5.89 | 3.37 | 3.25 |
| 7 | 2.73 | 4.15 | 2.40 | 1.83 | 1.27 | 2.70 | 2.30 | 1.25 | 2.00 | 3.43 | 2.35 | 1.54 |
| 8 | 2.05 | 1.80 | 1.40 | 1.40 | 1.25 | 1.20 | 1.83 | 1.15 | 1.65 | 1.50 | 1.62 | 1.28 |
| 9 | 8.70 | 8.58 | 6.15 | 4.68 | 8.97 | 8.65 | 5.72 | 3.20 | 8.84 | 8.61 | 5.94 | 3.94 |
| 10 | 3.10 | 5.10 | 4.98 | 3.35 | 5.77 | 5.70 | 3.38 | 2.30 | 4.44 | 5.40 | 4.18 | 2.82 |
| 11 | 6.75 | 5.88 | 3.65 | 2.55 | 6.55 | 4.55 | 1.28 | 1.40 | 6.65 | 5.22 | 2.47 | 1.98 |
| 12 | 2.88 | 3.23 | 3.28 | 2.88 | 3.55 | 3.93 | 4.33 | 4.15 | 3.22 | 3.58 | 3.81 | 3.52 |
| 13 | 7.80 | 8.03 | 2.85 | 7.60 | 7.50 | 8.00 | 1.80 | 8.33 | 7.65 | 8.02 | 2.33 | 7.97 |
| 14 | 6.30 | 5.75 | 2.03 | 4.68 | 7.68 | 7.15 | 2.10 | 2.28 | 6.99 | 6.45 | 2.07 | 3.48 |
| 15 | 2.23 | 1.80 | 1.48 | 1.70 | 2.00 | 3.00 | 1.58 | 1.38 | 2.12 | 2.40 | 1.53 | 1.54 |
| 16 | 7.78 | 8.35 | 4.45 | 7.15 | 6.73 | 5.08 | 3.50 | 7.10 | 7.26 | 6.72 | 3.98 | 7.13 |
| 17 | 2.78 | 3.28 | 2.78 | 2.70 | 3.20 | 2.86 | 2.53 | 2.93 | 2.99 | 3.07 | 2.66 | 2.82 |

## TABLE 26

## DIFFERENCE SCORES (BEFORE THERAPY MINUS AFTER THERAPY)*

## FOR SPEAKING, READING AND SPEAKING-READING COMBINED

| Subject No. | SPEAKING | READING | SP-RD COM |
|---|---|---|---|
| 1 | +3.40 | +3.52 | +3.46 |
| 2 | + .97 | +4.50 | +2.74 |
| 3 | + .87 | - .68 | + .10 |
| 4 | + .88 | +1.65 | +1.26 |
| 5 | +1.20 | + .10 | + .65 |
| 6 | +1.30 | +3.75 | +2.52 |
| 7 | +1.75 | + .40 | +1.08 |
| 8 | + .40 | - .63 | - .12 |
| 9 | +2.43 | +2.93 | +2.67 |
| 10 | + .12 | +2.32 | +1.22 |
| 11 | +2.23 | +3.27 | +2.75 |
| 12 | - .05 | - .40 | - .23 |
| 13 | +5.18 | +6.20 | +5.69 |
| 14 | +3.72 | +5.05 | +4.38 |
| 15 | + .32 | +1.42 | + .87 |
| 16 | +3.90 | +1.58 | +2.74 |
| 17 | + .50 | + .33 | + .41 |

* a plus score indicates a lower severity score after therapy

## TABLE 27

## SELF-RATINGS OF REACTIONS TO SPEAKING SITUATIONS

### SELF-RATINGS ON DEGREE OF AVOIDANCE, REACTION, SEVERITY OF STUTTERING, AND FREQUENCY OF ENCOUNTERING SITUATIONS AT EACH OF FOUR TEST SESSIONS

| ubject No. | AVOIDANCE | | | | REACTION | | | | STUTTERING SEVERITY | | | | FREQUENCY OF ENCOUNTER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 1.70 | 1.90 | 1.70 | 1.53 | 2.40 | 2.15 | 1.90 | 1.78 | 2.50 | 2.40 | 2.10 | 2.35 | 3.80 | 3.60 | 3.80 | 3.43 |
| 2 | 2.20 | 2.15 | 1.10 | 1.05 | 2.40 | 2.43 | 1.10 | 1.28 | 3.00 | 2.63 | 1.40 | 1.35 | 4.40 | 4.05 | 3.50 | 3.68 |
| 3 | 1.80 | 1.18 | 1.50 | 1.55 | 2.70 | 1.55 | 1.40 | 1.53 | 2.40 | 1.80 | 2.00 | 1.90 | 2.50 | 2.60 | 3.30 | 2.70 |
| 4 | 2.20 | 2.18 | 1.60 | 1.38 | 2/70 | 2.75 | 2.20 | 2.10 | 2.10 | 2.35 | 2.20 | 1.75 | 4.00 | 3.70 | 4.10 | 4.15 |
| 5 | 1.90 | 2.13 | 1.70 | 1.65 | 2.00 | 1.86 | 1.70 | 1.55 | 2.10 | 2.93 | 2.60 | 1.95 | 3.70 | 3.88 | 3.90 | 3.63 |
| 6 | 2.50 | 2.15 | 1.30 | 1.15 | 2.30 | 1.66 | 1.30 | 1.78 | 2.10 | 2.21 | 1.40 | 1.63 | 4.00 | 3.68 | 3.70 | 4.05 |
| 7 | 1.50 | 2.33 | 1.40 | 1.33 | 1.80 | 2.08 | 1.70 | 1.53 | 1.50 | 1.63 | 1.60 | 1.53 | 3.80 | 4.13 | 3.60 | 3.65 |
| 8 | 2.00 | 2.53 | 1.40 | 1.33 | 2.10 | 2.55 | 1.50 | 1.28 | 1.80 | 2.61 | 1.70 | 1.55 | 3.50 | 4.21 | 4.00 | 3.50 |
| 9 | 1.90 | 1.80 | 1.00 | 1.00 | 2.00 | 1.70 | 1.00 | 1.00 | 1.70 | 1.70 | 1.28 | 1.40 | 4.10 | 4.20 | 4.21 | 3.70 |
| 10 | 2.50 | 2.10 | 1.80 | 1.80 | 2.60 | 2.30 | 1.83 | 1.90 | 2.20 | 2.70 | 2.43 | 2.30 | 4.60 | 4.30 | 3.53 | 3.90 |
| 11 | 2.40 | 2.80 | 2.20 | 1.90 | 2.60 | 2.60 | 2.20 | 1.90 | 3.20 | 3.40 | 2.90 | 2.60 | 3.80 | 4.30 | 4.20 | 4.00 |
| 12 | 1.30 | 1.30 | 1.30 | 1.30 | 2.20 | 2.00 | 1.90 | 1.90 | 2.20 | 2.00 | 1.90 | 1.90 | 4.20 | 4.20 | 4.10 | 4.20 |
| 13 | 3.20 | 3.40 | 3.00 | 2.60 | 2.00 | 3.20 | 3.30 | 2.80 | 2.80 | 3.50 | 3.60 | 2.60 | 3.70 | 4.00 | 3.80 | 3.80 |
| 14 | 1.60 | 1.50 | 1.30 | 1.30 | 2.00 | 1.80 | 1.60 | 1.30 | 2.40 | 1.70 | 1.60 | 1.40 | 3.90 | 4.10 | 4.40 | 4.10 |
| 15 | 1.80 | 1.80 | 2.10 | 1.60 | 1.60 | 2.00 | 1.94 | 1.90 | 2.80 | 2.70 | 2.40 | 3.00 | 4.00 | 3.80 | 4.10 | 3.20 |
| 16 | 3.20 | 3.00 | 2.00 | 2.80 | 3.00 | 2.40 | 2.20 | 2.50 | 3.60 | 3.50 | 3.00 | 3.40 | 4.60 | 4.50 | 4.45 | 4.60 |
| 17 | 2.70 | 3.00 | 1.51 | 2.45 | 3.10 | 3.20 | 1.90 | 2.40 | 3.10 | 3.30 | 2.70 | 3.00 | 2.90 | 4.10 | 4.10 | 4.40 |

## TABLE 28

## DIFFERENCE SCORES (BEFORE THERAPY MINUS AFTER THERAPY)* ON SELF-RATINGS OF REACTIONS TO SPEAKING SITUATIONS

| Subject No. | AVOIDANCE | REACTION | STUTTERING SEVERITY | FREQUENCY OF ENCOUNTER |
|---|---|---|---|---|
| 1 | + .20 | + .25 | + .30 | - .20 |
| 2 | +1.05 | +1.33 | +1.23 | + .55 |
| 3 | - .32 | + .15 | - .20 | - .70 |
| 4 | + .58 | + .55 | + .15 | - .40 |
| 5 | + .43 | + .16 | - .67 | - .02 |
| 6 | + .86 | + .36 | + .81 | - .02 |
| 7 | + .93 | + .38 | + .03 | + .53 |
| 8 | +1.13 | +1.05 | + .91 | + .21 |
| 9 | + .80 | + .70 | + .42 | - .01 |
| 10 | + .30 | + .47 | + .27 | + .77 |
| 11 | + .60 | + .40 | + .50 | + .10 |
| 12 | 0 | + .10 | + .10 | + .10 |
| 13 | + .40 | - .10 | - .10 | + .20 |
| 14 | + .20 | + .20 | + .10 | - .30 |
| 15 | - .30 | + .06 | + .30 | - .30 |
| 16 | +1.00 | + .20 | + .50 | + .05 |
| 17 | +1.49 | +1.30 | + .60 | 0 |

* a plus score indicates a lower score after therapy

## TABLE 29

## IOWA SCALE OF ATTITUDE TOWARD STUTTERING

### SELF-RATING OF ATTITUDE AT EACH OF FOUR TEST SESSIONS

| | Test Periods | | | |
|---|---|---|---|---|
| Subject No. | 1 | 2 | 3 | 4 |
| 1 | 1.36 | 1.45 | 1.32 | 1.22 |
| 2 | 2.11 | 1.85 | 1.08 | 1.00 |
| 3 | 1.30 | 1.28 | 1.32 | 1.02 |
| 4 | 2.42 | 2.88 | 1.24 | 1.24 |
| 5 | 2.16 | 1.84 | 1.16 | 1.10 |
| 6 | 2.43 | 2.30 | 1.28 | 1.58 |
| 7 | 2.62 | 3.00 | 1.55 | 1.33 |
| 8 | 1.65 | 1.40 | 1.40 | 1.35 |
| 9 | 2.59 | 2.06 | 1.24 | 2.17 |
| 10 | 1.44 | 1.26 | 1.11 | 1.22 |
| 11 | 1.49 | 1.92 | 1.47 | 1.52 |
| 12 | 1.19 | 1.05 | 1.04 | 1.02 |
| 13 | 2.44 | 2.08 | 1.19 | 1.16 |
| 14 | 2.41 | 2.34 | 1.06 | 1.18 |
| 15 | 2.14 | 2.02 | 1.46 | 1.87 |
| 16 | 1.91 | 2.02 | 1.22 | 1.84 |
| 17 | 1.09 | 1.18 | 1.11 | 1.69 |

## TABLE 30

## DIFFERENCE SCORES (BEFORE THERAPY MINUS AFTER THERAPY)* ON SELF-RATING OF ATTITUDE

| Subject No. | ATTITUDE |
|---|---|
| 1 | + .13 |
| 2 | + .77 |
| 3 | - .04 |
| 4 | +1.64 |
| 5 | + .68 |
| 6 | +1.02 |
| 7 | +1.45 |
| 8 | 0 |
| 9 | + .82 |
| 10 | + .15 |
| 11 | + .45 |
| 12 | + .01 |
| 13 | + .89 |
| 14 | +1.28 |
| 15 | + .56 |
| 16 | + .80 |
| 17 | + .07 |

* a plus score indicates a lower score after therapy

# TABLE 31

## EDWARDS PERSONAL PREFERENCE SCHEDULE DATA

## PERCENTILE SCORES ON VARIABLES OF THE EPPS FOR EACH OF FOUR TEST SESSIONS

| Subject No. | ACH | | | | DEF | | | | ORD | | | | EXH | | | | AUT | | | | AFF | | | | INT | | | | SUC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 99 | 98 | 99 | 91 | 62 | 71 | 86 | 95 | 47 | 40 | 63 | 47 | 66 | 29 | 57 | 87 | 70 | 37 | 37 | 46 | 08 | 18 | 24 | 31 | 28 | 10 | 15 | 53 | 65 | 65 | 42 | 13 |
| 2 | 74 | 56 | 21 | 21 | 25 | 42 | 32 | 25 | 91 | 63 | 33 | 20 | 47 | 57 | 87 | 95 | 03 | 03 | 02 | 29 | 67 | 87 | 87 | 91 | 82 | 82 | 69 | 69 | 91 | 91 | 83 | 50 |
| 3 | 65 | 74 | 91 | 29 | 08 | 18 | 08 | 25 | 11 | 40 | 22 | 47 | 92 | 22 | 82 | 75 | 92 | 37 | 29 | 70 | 39 | 39 | 31 | 39 | 61 | 28 | 44 | 95 | 58 | 83 | 65 | 58 |
| 4 | 96 | 70 | 70 | 83 | 56 | 27 | 14 | 46 | 85 | 99 | 90 | 90 | 15 | 09 | 15 | 61 | 85 | 98 | 98 | 99 | 05 | 05 | 07 | 03 | 95 | 93 | 99 | 77 | 24 | 12 | 08 | 05 |
| 5 | 98 | 97 | 98 | 91 | 25 | 62 | 42 | 25 | 20 | 47 | 33 | 11 | 99 | 99 | 99 | 99 | 77 | 70 | 70 | 77 | 01 | 01 | 03 | 08 | 95 | 61 | 82 | 87 | 77 | 87 | 65 | 91 |
| 6 | 86 | 74 | 56 | 86 | 62 | 52 | 32 | 52 | 33 | 26 | 01 | 26 | 75 | 66 | 66 | 75 | 77 | 62 | 62 | 46 | 81 | 58 | 58 | 81 | 53 | 92 | 82 | 53 | 04 | 26 | 13 | 19 |
| 7 | 81 | 15 | 91 | 98 | 95 | 95 | 86 | 86 | 33 | 40 | 26 | 77 | 03 | 14 | 14 | 14 | 21 | 02 | 62 | 15 | 39 | 81 | 75 | 39 | 02 | 10 | 02 | 02 | 33 | 50 | 19 | 50 |
| 8 | 29 | 29 | 37 | 29 | 42 | 42 | 32 | 52 | 96 | 55 | 63 | 83 | 09 | 57 | 87 | 66 | 54 | 54 | 77 | 54 | 75 | 67 | 91 | 67 | 69 | 53 | 98 | 28 | 42 | 65 | 08 | 26 |
| 9 | 56 | 37 | 56 | 74 | 01 | 12 | 02 | 01 | 26 | 11 | 47 | 08 | 47 | 99 | 95 | 87 | 70 | 88 | 37 | 62 | 58 | 48 | 67 | 67 | 04 | 06 | 21 | 61 | 99 | 99 | 93 | 93 |
| 10 | 37 | 74 | 37 | 94 | 01 | 01 | 01 | 04 | 55 | 47 | 77 | 88 | 92 | 95 | 66 | 92 | 88 | 92 | 88 | 62 | 75 | 18 | 18 | 31 | 01 | 06 | 06 | 06 | 58 | 96 | 91 | 83 |
| 11 | 74 | 86 | 91 | 91 | 18 | 12 | 08 | 12 | 63 | 40 | 77 | 26 | 87 | 97 | 82 | 82 | 15 | 84 | 77 | 84 | 87 | 58 | 12 | 31 | 28 | 44 | 36 | 61 | 08 | 02 | 13 | 02 |
| 12 | 86 | 74 | 91 | 81 | 32 | 32 | 62 | 42 | 03 | 15 | 20 | 47 | 87 | 97 | 47 | 92 | 97 | 15 | 70 | 70 | 58 | 08 | 18 | 18 | 04 | 44 | 06 | 15 | 87 | 87 | 42 | 77 |
| 13 | 99 | 74 | 94 | 97 | 42 | 12 | 12 | 25 | 15 | 01 | 01 | 01 | 87 | 47 | 57 | 87 | 77 | 88 | 77 | 46 | 94 | 81 | 48 | 87 | 10 | 61 | 61 | 61 | 83 | 71 | 58 | 58 |
| 14 | 81 | 65 | 86 | 99 | 52 | 71 | 86 | 52 | 63 | 63 | 88 | 47 | 82 | 75 | 95 | 87 | 37 | 54 | 54 | 77 | 24 | 39 | 12 | 12 | 10 | 10 | 53 | 36 | 93 | 83 | 42 | 65 |
| 15 | 46 | 97 | 97 | 99 | 52 | 25 | 08 | 42 | 08 | 11 | 11 | 08 | 66 | 75 | 87 | 92 | 62 | 46 | 37 | 37 | 39 | 87 | 81 | 81 | 28 | 04 | 10 | 06 | 50 | 87 | 71 | 83 |
| 16 | 65 | 06 | 29 | 15 | 42 | 71 | 79 | 52 | 77 | 71 | 83 | 47 | 29 | 82 | 75 | 47 | 62 | 37 | 88 | 54 | 48 | 75 | 24 | 58 | 36 | 82 | 77 | 61 | 83 | 87 | 58 | 71 |
| 17 | 91 | 91 | 91 | 91 | 32 | 04 | 25 | 25 | 05 | 03 | 05 | 01 | 97 | 99 | 95 | 98 | 62 | 62 | 77 | 77 | 58 | 24 | 18 | 48 | 92 | 82 | 95 | 87 | 26 | 26 | 26 | 33 |

TABLE 31 CONTINUED

| Subject No. | DOM | | | | ABA | | | | NUR | | | | CHG | | | | END | | | | HET | | | | AGG | | | | CON | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 89 | 80 | 69 | 57 | 01 | 02 | 01 | 01 | 11 | 11 | 07 | 07 | 18 | 97 | 76 | 76 | 44 | 18 | 67 | 52 | 73 | 76 | 85 | 76 | 54 | 97 | 37 | 87 | 29 | 99 | 70 | 08 |
| 2 | 31 | 14 | 85 | 09 | 91 | 98 | 49 | 49 | 99 | 99 | 99 | 90 | 10 | 10 | 24 | 54 | 07 | 13 | 01 | 01 | 58 | 66 | 85 | 69 | 08 | 01 | 16 | 22 | 87 | 87 | 97 | 97 |
| 3 | 50 | 50 | 57 | 44 | 01 | 41 | 12 | 06 | 15 | 47 | 70 | 20 | 87 | 87 | 70 | 38 | 18 | 29 | 13 | 37 | 97 | 85 | 93 | 93 | 82 | 62 | 54 | 69 | 48 | 03 | 17 | 01 |
| 4 | 09 | 40 | 64 | 71 | 75 | 82 | 59 | 18 | 06 | 03 | 01 | 02 | 60 | 45 | 30 | 18 | 85 | 85 | 99 | 85 | 71 | 71 | 78 | 87 | 20 | 38 | 20 | 64 | 66 | 12 | 45 | 66 |
| 5 | 63 | 31 | 50 | 44 | 41 | 21 | 21 | 17 | 01 | 01 | 01 | 04 | 54 | 76 | 06 | 54 | 02 | 02 | 18 | 01 | 80 | 91 | 93 | 98 | 82 | 76 | 87 | 76 | 97 | 97 | 87 | 70 |
| 6 | 97 | 99 | 99 | 99 | 75 | 27 | 27 | 81 | 07 | 07 | 70 | 15 | 14 | 62 | 62 | 54 | 07 | 03 | 23 | 18 | 58 | 50 | 50 | 58 | 87 | 87 | 87 | 76 | 87 | 97 | 29 | 97 |
| 7 | 75 | 93 | 80 | 98 | 62 | 41 | 09 | 06 | 81 | 90 | 55 | 76 | 87 | 62 | 82 | 87 | 52 | 67 | 29 | 59 | 87 | 82 | 97 | 42 | 16 | 16 | 29 | 37 | 48 | 03 | 97 | 48 |
| 8 | 31 | 37 | 25 | 57 | 56 | 69 | 33 | 27 | 81 | 47 | 98 | 70 | 94 | 54 | 91 | 76 | 59 | 44 | 03 | 10 | 29 | 58 | 62 | 58 | 22 | 62 | 37 | 94 | 70 | 08 | 29 | 08 |
| 9 | 69 | 75 | 63 | 69 | 27 | 17 | 33 | 41 | 47 | 07 | 26 | 47 | 31 | 70 | 46 | 62 | 23 | 05 | 03 | 03 | 99 | 95 | 99 | 99 | 46 | 29 | 46 | 08 | 70 | 70 | 70 | 87 |
| 10 | 19 | 37 | 50 | 44 | 12 | 02 | 02 | 01 | 55 | 11 | 20 | 26 | 96 | 91 | 91 | 54 | 13 | 29 | 29 | 52 | 98 | 99 | 98 | 99 | 69 | 54 | 11 | 29 | 97 | 29 | 70 | 17 |
| 11 | 50 | 25 | 09 | 57 | 41 | 56 | 56 | 41 | 55 | 40 | 55 | 55 | 46 | 18 | 24 | 46 | 74 | 90 | 97 | 74 | 76 | 76 | 82 | 73 | 46 | 54 | 46 | 62 | 97 | 99 | 99 | 99 |
| 12 | 63 | 69 | 63 | 19 | 12 | 06 | 33 | 27 | 40 | 40 | 63 | 15 | 94 | 82 | 70 | 76 | 18 | 03 | 18 | 13 | 87 | 91 | 85 | 93 | 08 | 54 | 69 | 82 | 17 | 17 | 08 | 48 |
| 13 | 31 | 75 | 69 | 50 | 75 | 81 | 98 | 62 | 63 | 76 | 40 | 55 | 62 | 31 | 18 | 62 | 01 | 10 | 05 | 03 | 69 | 58 | 62 | 80 | 22 | 76 | 97 | 62 | 87 | 29 | 70 | 87 |
| 14 | 63 | 44 | 93 | 99 | 12 | 56 | 41 | 09 | 40 | 63 | 07 | 15 | 91 | 46 | 46 | 87 | 18 | 18 | 07 | 10 | 69 | 69 | 76 | 54 | 46 | 46 | 05 | 11 | 48 | 03 | 70 | 97 |
| 15 | 89 | 93 | 97 | 95 | 75 | 49 | 06 | 01 | 20 | 47 | 33 | 11 | 38 | 38 | 54 | 76 | 52 | 23 | 23 | 18 | 76 | 66 | 85 | 80 | 76 | 29 | 62 | 62 | 70 | 70 | 70 | 29 |
| 16 | 50 | 50 | 57 | 37 | 27 | 17 | 21 | 17 | 55 | 63 | 26 | 55 | 82 | 76 | 70 | 94 | 05 | 03 | 05 | 37 | 69 | 58 | 54 | 73 | 62 | 54 | 82 | 62 | 70 | 03 | 70 | 48 |
| 17 | 63 | 69 | 75 | 69 | 27 | 62 | 41 | 21 | 20 | 11 | 15 | 40 | 87 | 54 | 14 | 87 | 13 | 23 | 07 | 07 | 62 | 76 | 82 | 69 | 54 | 76 | 46 | 62 | 70 | 87 | 87 | 29 |

## TABLE 32

## DIFFERENCE PERCENTILE SCORES (BEFORE THERAPY MINUS AFTER THERAPY)* ON VARIABLES OF THE EPPS

| Subject No. | ACH | DEF | ORD | EXH | AUT | AFF | INT | SUC | DOM | ABA | NUR | CHG | END | HET | AGG | CON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -01 | -15 | -23 | -28 | 0 | -06 | -05 | +23 | +11 | +01 | +04 | +21 | -49 | -09 | +60 | +29 |
| 2 | +35 | +10 | +30 | -30 | +01 | 0 | +13 | +08 | -71 | +49 | 0 | -14 | +12 | -19 | -15 | -10 |
| 3 | -17 | +10 | +07 | -60 | +08 | +08 | -16 | +18 | -07 | +29 | -23 | +17 | +16 | -08 | +08 | -14 |
| 4 | 0 | +13 | +09 | -06 | 0 | -02 | -06 | -04 | -24 | +23 | +02 | +15 | -14 | -07 | +18 | -33 |
| 5 | -01 | +20 | +14 | 0 | 0 | -02 | -21 | +22 | -19 | 0 | 0 | +70 | -16 | -02 | -11 | +10 |
| 6 | +18 | +20 | +25 | 0 | 0 | 0 | +10 | +13 | 0 | 0 | -63 | 0 | -20 | 0 | 0 | +68 |
| 7 | -76 | +09 | +14 | 0 | -60 | +06 | +08 | +31 | +13 | +32 | +35 | -20 | +38 | -15 | -13 | -94 |
| 8 | -08 | +10 | -08 | -30 | -23 | -24 | -45 | +57 | +12 | +36 | -51 | -37 | +41 | -04 | +25 | -21 |
| 9 | -19 | +10 | -36 | +04 | +51 | -19 | -15 | +06 | +12 | -16 | -19 | +24 | +02 | -04 | -17 | 0 |
| 10 | +37 | 0 | -30 | +29 | +04 | 0 | 0 | +05 | -13 | 0 | -09 | 0 | 0 | +01 | +43 | -41 |
| 11 | -05 | +04 | -37 | +15 | +07 | +46 | +08 | -11 | +16 | 0 | -15 | -06 | -07 | -06 | +08 | 0 |
| 12 | -17 | -30 | -05 | +50 | -55 | -10 | +38 | +45 | +06 | -27 | -23 | +12 | -15 | +06 | -15 | +09 |
| 13 | -20 | 0 | 0 | -10 | +11 | +33 | 0 | +13 | +06 | -17 | +36 | +13 | +05 | -04 | -21 | -41 |
| 14 | -21 | -15 | -25 | -20 | 0 | +27 | -43 | +41 | -49 | +15 | +56 | 0 | +11 | -07 | +41 | -67 |
| 15 | 0 | +17 | 0 | -12 | +09 | +06 | -06 | +16 | -04 | +43 | +14 | -16 | 0 | -19 | -33 | 0 |
| 16 | -23 | -08 | -12 | +07 | -51 | +51 | +05 | +29 | -07 | -04 | +37 | +06 | -02 | +04 | -28 | -67 |
| 17 | 0 | -21 | -02 | +04 | -15 | +06 | -13 | 0 | -06 | +21 | -04 | +40 | +16 | -06 | +30 | 0 |

* a plus score indicates a lower percentile score after therapy

## TABLE 33

## MINNESOTA MULTIPHASIC PERSONALITY INVENTORY DATA

### T-SCORES ON SCALES OF THE MMPI
### FOR EACH OF FOUR TEST SESSIONS

| Subject No. | L | | | | F | | | | K | | | | HS | | | | D | | | | HY | | | | PD | | | | MF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 40 | 43 | 43 | 40 | 46 | 46 | 50 | 48 | 61 | 60 | 64 | 61 | 47 | 49 | 54 | 49 | 39 | 48 | 48 | 46 | 45 | 51 | 51 | 55 | 48 | 50 | 76 | 49 | 59 | 57 | 61 | 55 |
| 2 | 50 | 53 | 53 | 56 | 46 | 46 | 46 | 46 | 48 | 66 | 66 | 66 | 41 | 52 | 52 | 49 | 56 | 60 | 51 | 51 | 51 | 58 | 62 | 59 | 50 | 62 | 50 | 53 | 73 | 63 | 63 | 55 |
| 3 | 56 | 56 | 50 | 53 | 66 | 62 | 68 | 58 | 53 | 51 | 44 | 42 | 65 | 57 | 54 | 62 | 58 | 72 | 60 | 58 | 58 | 60 | 58 | 60 | 55 | 57 | 71 | 46 | 61 | 62 | 59 | 65 |
| 4 | 60 | 53 | 50 | 53 | 68 | 62 | 60 | 60 | 51 | 51 | 53 | 51 | 72 | 78 | 60 | 48 | 75 | 76 | 67 | 59 | 77 | 79 | 61 | 50 | 67 | 62 | 79 | 57 | 34 | 51 | 51 | 61 |
| 5 | 36 | 36 | 36 | 36 | 50 | 46 | 53 | 58 | 42 | 36 | 42 | 33 | 49 | 41 | 47 | 47 | 68 | 48 | 48 | 48 | 45 | 41 | 40 | 44 | 55 | 43 | 60 | 50 | 53 | 55 | 47 | 47 |
| 6 | 50 | 43 | 46 | 46 | 50 | 48 | 53 | 48 | 42 | 53 | 57 | 55 | 36 | 42 | 47 | 47 | 45 | 39 | 44 | 44 | 46 | 45 | 55 | 47 | 39 | 40 | 46 | 39 | 43 | 47 | 43 | 43 |
| 7 | 50 | 50 | 56 | 50 | 46 | 48 | 50 | 50 | 66 | 70 | 68 | 70 | 49 | 52 | 49 | 52 | 53 | 48 | 48 | 41 | 55 | 60 | 58 | 58 | 53 | 67 | 53 | 50 | 51 | 51 | 53 | 57 |
| 8 | 43 | 42 | 39 | 43 | 53 | 48 | 44 | 46 | 44 | 43 | 46 | 40 | 61 | 47 | 36 | 44 | 77 | 55 | 46 | 41 | 58 | 44 | 38 | 35 | 55 | 34 | 27 | 20 | 59 | 31 | 45 | 49 |
| 9 | 46 | 43 | 43 | 50 | 48 | 58 | 46 | 53 | 59 | 48 | 57 | 61 | 47 | 47 | 59 | 57 | 50 | 58 | 56 | 63 | 58 | 53 | 56 | 58 | 53 | 39 | 46 | 50 | 49 | 59 | 71 | 59 |
| 10 | 43 | 36 | 43 | 53 | 55 | 50 | 48 | 48 | 59 | 64 | 57 | 64 | 59 | 52 | 54 | 54 | 44 | 39 | 44 | 51 | 56 | 55 | 47 | 59 | 53 | 57 | 55 | 64 | 47 | 43 | 95 | 47 |
| 11 | 46 | 46 | 50 | 53 | 44 | 50 | 46 | 44 | 68 | 72 | 66 | 70 | 49 | 82 | 49 | 52 | 44 | 53 | 48 | 46 | 56 | 63 | 51 | 60 | 57 | 63 | 55 | 53 | 45 | 47 | 46 | 47 |
| 12 | 40 | 43 | 36 | 46 | 53 | 48 | 66 | 62 | 59 | 68 | 48 | 68 | 54 | 54 | 57 | 75 | 56 | 48 | 51 | 68 | 59 | 62 | 58 | 75 | 60 | 64 | 60 | 69 | 49 | 65 | 63 | 65 |
| 13 | 46 | 53 | 53 | 43 | 55 | 60 | 55 | 60 | 64 | 61 | 55 | 68 | 59 | 52 | 57 | 54 | 51 | 67 | 58 | 58 | 64 | 64 | 65 | 65 | 74 | 64 | 64 | 76 | 67 | 73 | 71 | 71 |
| 14 | 60 | 46 | 53 | 50 | 48 | 50 | 50 | 53 | 64 | 62 | 59 | 62 | 54 | 49 | 52 | 49 | 53 | 53 | 41 | 44 | 56 | 55 | 45 | 49 | 53 | 74 | 60 | 48 | 59 | 55 | 51 | 61 |
| 15 | 40 | 40 | 36 | 43 | 46 | 46 | 44 | 44 | 59 | 55 | 51 | 61 | 47 | 44 | 57 | 44 | 56 | 51 | 44 | 51 | 62 | 51 | 47 | 53 | 46 | 36 | 41 | 50 | 59 | 51 | 45 | 41 |
| 16 | 50 | 57 | 53 | 43 | 62 | 53 | 58 | 46 | 46 | 63 | 61 | 62 | 47 | 57 | 52 | 52 | 48 | 60 | 46 | 56 | 50 | 56 | 58 | 62 | 62 | 67 | 56 | 50 | 65 | 59 | 65 | 55 |
| 17 | 39 | 40 | 46 | 40 | 44 | 46 | 44 | 44 | 68 | 69 | 66 | 62 | 49 | 54 | 52 | 47 | 44 | 52 | 44 | 48 | 51 | 64 | 62 | 51 | 55 | 50 | 46 | 50 | 40 | 45 | 47 | 45 |

TABLE 33 CONTINUED

| Subject No. | PA | | | | PT | | | | SC | | | | MA | | | | SI | | | | MAS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 41 | 50 | 44 | 50 | 47 | 48 | 46 | 48 | 50 | 59 | 32 | 53 | 63 | 55 | 55 | 58 | 45 | 43 | 47 | 43 | 04 | 05 | 04 | 04 |
| 2 | 53 | 53 | 59 | 53 | 46 | 66 | 58 | 58 | 40 | 53 | 53 | 53 | 55 | 58 | 57 | 55 | 47 | 46 | 36 | 39 | 13 | 11 | 05 | 03 |
| 3 | 56 | 43 | 53 | 53 | 71 | 64 | 66 | 58 | 76 | 86 | 82 | 63 | 55 | 60 | 86 | 68 | 55 | 60 | 58 | 60 | 16 | 13 | 22 | 20 |
| 4 | 59 | 52 | 47 | 44 | 74 | 69 | 65 | 50 | 75 | 70 | 55 | 51 | 55 | 58 | 53 | 50 | 67 | 60 | 67 | 66 | 33 | 31 | 18 | 18 |
| 5 | 53 | 44 | 53 | 53 | 71 | 62 | 66 | 48 | 69 | 57 | 63 | 51 | 73 | 56 | 75 | 78 | 60 | 55 | 48 | 52 | 27 | 26 | 23 | 22 |
| 6 | 44 | 50 | 47 | 41 | 40 | 46 | 44 | 42 | 32 | 40 | 44 | 42 | 43 | 43 | 40 | 43 | 58 | 45 | 42 | 40 | 09 | 16 | 06 | 06 |
| 7 | 56 | 53 | 53 | 56 | 58 | 62 | 54 | 56 | 57 | 57 | 53 | 71 | 53 | 60 | 50 | 48 | 46 | 39 | 37 | 38 | 09 | 07 | 06 | 03 |
| 8 | 59 | 45 | 35 | 41 | 66 | 50 | 44 | 40 | 51 | 41 | 36 | 36 | 45 | 34 | 28 | 30 | 53 | 45 | 40 | 43 | 26 | 16 | 12 | 11 |
| 9 | 47 | 41 | 50 | 44 | 44 | 54 | 52 | 60 | 55 | 55 | 51 | 51 | 45 | 70 | 60 | 55 | 45 | 51 | 48 | 44 | 03 | 18 | 15 | 15 |
| 10 | 47 | 38 | 38 | 44 | 54 | 56 | 50 | 56 | 71 | 61 | 51 | 59 | 62 | 65 | 65 | 53 | 44 | 41 | 42 | 50 | 06 | 04 | 04 | 02 |
| 11 | 59 | 53 | 47 | 56 | 52 | 32 | 50 | 56 | 53 | 36 | 50 | 53 | 45 | 46 | 53 | 55 | 45 | 50 | 48 | 48 | 03 | 11 | 04 | 03 |
| 12 | 56 | 65 | 62 | 59 | 68 | 69 | 58 | 75 | 58 | 69 | 65 | 73 | 45 | 58 | 55 | 55 | 58 | 40 | 50 | 50 | 14 | 10 | 25 | 16 |
| 13 | 47 | 53 | 56 | 62 | 69 | 60 | 52 | 62 | 76 | 73 | 63 | 78 | 65 | 53 | 48 | 60 | 53 | 55 | 52 | 51 | 12 | 14 | 10 | 08 |
| 14 | 50 | 62 | 50 | 56 | 52 | 64 | 46 | 46 | 50 | 53 | 51 | 53 | 60 | 78 | 60 | 63 | 49 | 42 | 43 | 40 | 06 | 15 | 04 | 05 |
| 15 | 53 | 47 | 50 | 41 | 58 | 46 | 44 | 52 | 53 | 46 | 44 | 51 | 40 | 30 | 43 | 35 | 49 | 46 | 49 | 44 | 04 | 04 | 04 | 03 |
| 16 | 59 | 53 | 62 | 47 | 73 | 67 | 66 | 58 | 67 | 63 | 61 | 48 | 60 | 43 | 58 | 40 | 54 | 60 | 53 | 49 | 23 | 19 | 15 | 14 |
| 17 | 56 | 53 | 59 | 50 | 54 | 54 | 54 | 50 | 59 | 53 | 53 | 51 | 48 | 53 | 48 | 50 | 41 | 40 | 38 | 39 | 00 | 05 | 02 | 01 |

## TABLE 34

## DIFFERENCE T-SCORES (BEFORE THERAPY MINUS AFTER THERAPY)* ON SCALES OF THE MMPI

| Subject No. | L | F | K | HS | D | HY | PD | MF | PA | PT | SC | MA | SI | MAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | -04 | -04 | -05 | 0 | 0 | -26 | -04 | +06 | +02 | +27 | 0 | -04 | +01 |
| 2 | 0 | 0 | 0 | 0 | +09 | -04 | +12 | 0 | -06 | +08 | 0 | +01 | +10 | +06 |
| 3 | +06 | -06 | +07 | +03 | +12 | +02 | -14 | +03 | -10 | -02 | +04 | -26 | +02 | -09 |
| 4 | +03 | +02 | -02 | +18 | +09 | +18 | -17 | 0 | +05 | +04 | +15 | +05 | -07 | +13 |
| 5 | 0 | -07 | -06 | -06 | 0 | +01 | -17 | +08 | -09 | -04 | -06 | -19 | +07 | +03 |
| 6 | -03 | -05 | -04 | -05 | -05 | -10 | -06 | +04 | +03 | +02 | -04 | +03 | +03 | +10 |
| 7 | -06 | -02 | +02 | +03 | 0 | +02 | +14 | -02 | 0 | +08 | +04 | +10 | +02 | +01 |
| 8 | +03 | +04 | -03 | +11 | +09 | +06 | +07 | -14 | +10 | +06 | +05 | +06 | +05 | +04 |
| 9 | 0 | +12 | -09 | -12 | +02 | -03 | -07 | -12 | -09 | +02 | +04 | +10 | +03 | +03 |
| 10 | -07 | +02 | +07 | -02 | -05 | +08 | +02 | -52 | 0 | +06 | +10 | 0 | -01 | 0 |
| 11 | -04 | +04 | +06 | +33 | +05 | +12 | +08 | +01 | +06 | -18 | -14 | -07 | +02 | +07 |
| 12 | +07 | -18 | +20 | -03 | -03 | +04 | +04 | +02 | +03 | +11 | +04 | +03 | -10 | -15 |
| 13 | 0 | +05 | +06 | -05 | +09 | -01 | 0 | +02 | -03 | +08 | +10 | +05 | +03 | +04 |
| 14 | -07 | 0 | +03 | -03 | +12 | +10 | +14 | +04 | +12 | +14 | +02 | +18 | -01 | +11 |
| 15 | +04 | +02 | +04 | -13 | +07 | +04 | -05 | +06 | -03 | +02 | +02 | -13 | -03 | 0 |
| 16 | +04 | -05 | +02 | +05 | +14 | -02 | +11 | -06 | -09 | +01 | +02 | -15 | +07 | +04 |
| 17 | -06 | +02 | +03 | +02 | +09 | +02 | +04 | -02 | -06 | 0 | 0 | +05 | +02 | +03 |

* a plus score indicates a lower T-score after therapy

# TABLE 35

## HOLTZMAN INKBLOT TECHNIQUE DATA

## PERCENTILE SCORES ON VARIABLES OF THE HOLTZMAN INKBLOT TECHNIQUE FOR EACH OF FOUR TEST SESSIONS

| Subject No. | RT | | | | R | | | | L | | | | S | | | | FD | | | | FA | | | | C | | | | SH | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 26 | 26 | 44 | 59 | 36 | 36 | 36 | 36 | 39 | 19 | 11 | 24 | 50 | 50 | 50 | 50 | 77 | 89 | 82 | 82 | 19 | 13 | 43 | 43 | 87 | 85 | 92 | 90 | 88 | 92 | 96 | 99 |
| 2 | 47 | 68 | 42 | 23 | 55 | 36 | 36 | 36 | 69 | 81 | 85 | 64 | 83 | 50 | 50 | 50 | 54 | 94 | 95 | 94 | 68 | 47 | 86 | 59 | 80 | 15 | 67 | 63 | 97 | 79 | 96 | 89 |
| 3 | 06 | 03 | 02 | 08 | 84 | 84 | 84 | 84 | 53 | 65 | 48 | 33 | 63 | 63 | 63 | 63 | 83 | 96 | 75 | 83 | 02 | 03 | 02 | 17 | 77 | 86 | 96 | 77 | 54 | 82 | 66 | 54 |
| 4 | 52 | 72 | 62 | 59 | 36 | 36 | 36 | 36 | 42 | 19 | 24 | 24 | 50 | 50 | 50 | 50 | 31 | 63 | 70 | 77 | 35 | 68 | 43 | 86 | 83 | 97 | 80 | 90 | 96 | 96 | 99 | 96 |
| 5 | 86 | 83 | 42 | 23 | 36 | 36 | 36 | 36 | 78 | 78 | 51 | 69 | 50 | 50 | 50 | 50 | 82 | 95 | 82 | 82 | 80 | 80 | 35 | 80 | 28 | 15 | 09 | 31 | 89 | 83 | 79 | 89 |
| 6 | 12 | 26 | 30 | 30 | 36 | 36 | 36 | 36 | 33 | 46 | 30 | 33 | 50 | 50 | 50 | 50 | 77 | 94 | 94 | 92 | 35 | 98 | 13 | 43 | 90 | 73 | 96 | 95 | 96 | 96 | 96 | 96 |
| 7 | 88 | 86 | 98 | 90 | 68 | 55 | 36 | 46 | 64 | 81 | 81 | 90 | 50 | 50 | 93 | 83 | 54 | 95 | 95 | 56 | 47 | 35 | 43 | 43 | 01 | 03 | 03 | 01 | 79 | 41 | 31 | 60 |
| 8 | 80 | 59 | 47 | 44 | 55 | 46 | 36 | 46 | 15 | 11 | 11 | 11 | 50 | 50 | 50 | 50 | 70 | 38 | 25 | 38 | 13 | 47 | 08 | 35 | 83 | 97 | 99 | 96 | 99 | 99 | 99 | 99 |
| 9 | 99 | 92 | 92 | 77 | 92 | 44 | 68 | 62 | 42 | 85 | 69 | 64 | 50 | 50 | 50 | 50 | 89 | 94 | 54 | 63 | 47 | 43 | 25 | 43 | 31 | 31 | 20 | 58 | 19 | 19 | 09 | 14 |
| 10 | 30 | 30 | 44 | 30 | 36 | 36 | 36 | 36 | 97 | 98 | 97 | 96 | 50 | 83 | 50 | 83 | 89 | 89 | 94 | 97 | 19 | 10 | 01 | 02 | 01 | 04 | 01 | 01 | 01 | 01 | 02 | 01 |
| 11 | 90 | 24 | 08 | 14 | 84 | 84 | 84 | 84 | 83 | 76 | 86 | 83 | 88 | 63 | 63 | 63 | 34 | 50 | 59 | 65 | 86 | 47 | 52 | 73 | 81 | 71 | 30 | 54 | 66 | 62 | 45 | 54 |
| 12 | 68 | 49 | 30 | 19 | 36 | 36 | 36 | 46 | 15 | 24 | 33 | 42 | 83 | 50 | 50 | 50 | 08 | 19 | 06 | 04 | 25 | 19 | 25 | 43 | 99 | 99 | 99 | 99 | 98 | 99 | 99 | 97 |
| 13 | 68 | 44 | 35 | 15 | 36 | 36 | 36 | 36 | 85 | 69 | 64 | 72 | 50 | 50 | 50 | 50 | 85 | 77 | 92 | 85 | 35 | 10 | 08 | 25 | 20 | 70 | 52 | 73 | 41 | 86 | 73 | 31 |
| 14 | 74 | 42 | 19 | 15 | 36 | 36 | 36 | 36 | 78 | 46 | 51 | 33 | 83 | 50 | 50 | 50 | 70 | 38 | 63 | 46 | 43 | 25 | 47 | 13 | 48 | 90 | 83 | 92 | 79 | 92 | 73 | 88 |
| 15 | 92 | 90 | 74 | 80 | 46 | 46 | 46 | 77 | 24 | 19 | 11 | 30 | 50 | 50 | 50 | 83 | 46 | 77 | 82 | 63 | 47 | 35 | 43 | 35 | 90 | 80 | 87 | 85 | 96 | 96 | 83 | 73 |
| 16 | 98 | 94 | 86 | 72 | 68 | 62 | 36 | 46 | 39 | 42 | 42 | 15 | 50 | 50 | 50 | 50 | 77 | 63 | 85 | 70 | 19 | 25 | 35 | 13 | 96 | 83 | 94 | 92 | 90 | 83 | 92 | 88 |
| 17 | 96 | 94 | 92 | 91 | 91 | 95 | 93 | 91 | 11 | 11 | 15 | 11 | 50 | 50 | 50 | 83 | 63 | 54 | 63 | 46 | 47 | 86 | 19 | 68 | 99 | 80 | 95 | 96 | 96 | 31 | 67 | 88 |

TABLE 35 CONTINUED

| Subject No. | M | | | | V | | | | I | | | | H | | | | A | | | | AT | | | | SX | | | | AB | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 94 | 99 | 99 | 99 | 54 | 27 | 54 | 27 | 97 | 98 | 99 | 99 | 98 | 97 | 92 | 95 | 19 | 46 | 46 | 54 | 27 | 27 | 27 | 27 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 93 |
| 2 | 93 | 99 | 99 | 99 | 90 | 97 | 95 | 96 | 96 | 99 | 99 | 99 | 79 | 96 | 95 | 92 | 79 | 95 | 96 | 97 | 27 | 45 | 27 | 27 | 94 | 94 | 94 | 94 | 85 | 85 | 93 | 85 |
| 3 | 99 | 99 | 92 | 96 | 93 | 91 | 94 | 95 | 52 | 82 | 80 | 88 | 97 | 99 | 96 | 96 | 66 | 66 | 19 | 53 | 64 | 15 | 28 | 64 | 90 | 82 | 82 | 82 | 55 | 68 | 55 | 55 |
| 4 | 99 | 99 | 46 | 99 | 96 | 90 | 96 | 87 | 97 | 90 | 99 | 87 | 74 | 92 | 92 | 76 | 09 | 26 | 37 | 46 | 97 | 88 | 86 | 45 | 98 | 94 | 94 | 94 | 99 | 99 | 99 | 98 |
| 5 | 92 | 94 | 66 | 74 | 27 | 27 | 27 | 54 | 91 | 96 | 90 | 82 | 88 | 83 | 77 | 71 | 72 | 95 | 95 | 85 | 45 | 66 | 66 | 27 | 94 | 94 | 94 | 94 | 85 | 93 | 85 | 85 |
| 6 | 99 | 98 | 97 | 99 | 77 | 27 | 90 | 80 | 93 | 91 | 98 | 99 | 95 | 92 | 99 | 95 | 54 | 63 | 54 | 79 | 27 | 27 | 45 | 27 | 94 | 94 | 94 | 94 | 93 | 96 | 97 | 98 |
| 7 | 94 | 96 | 96 | 88 | 27 | 54 | 54 | 54 | 99 | 97 | 99 | 98 | 65 | 74 | 50 | 68 | 97 | 99 | 99 | 99 | 27 | 27 | 27 | 27 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 85 |
| 8 | 76 | 40 | 33 | 33 | 54 | 27 | 27 | 27 | 09 | 08 | 06 | 08 | 86 | 55 | 55 | 60 | 26 | 37 | 09 | 09 | 81 | 66 | 81 | 81 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 85 |
| 9 | 54 | 88 | 40 | 25 | 70 | 27 | 70 | 27 | 75 | 91 | 30 | 58 | 55 | 76 | 44 | 50 | 19 | 92 | 85 | 92 | 45 | 45 | 27 | 66 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 85 |
| 10 | 98 | 94 | 74 | 93 | 27 | 90 | 80 | 95 | 93 | 93 | 82 | 86 | 99 | 99 | 99 | 99 | 01 | 03 | 05 | 54 | 27 | 27 | 27 | 27 | 99 | 99 | 99 | 99 | 85 | 85 | 85 | 85 |
| 11 | 15 | 13 | 25 | 35 | 68 | 55 | 47 | 55 | 43 | 27 | 52 | 52 | 11 | 14 | 14 | 20 | 84 | 91 | 94 | 96 | 94 | 94 | 95 | 76 | 82 | 82 | 82 | 82 | 55 | 68 | 55 | 68 |
| 12 | 90 | 85 | 76 | 33 | 80 | 80 | 27 | 27 | 82 | 82 | 58 | 15 | 12 | 16 | 06 | 02 | 19 | 26 | 19 | 26 | 45 | 45 | 27 | 66 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 85 |
| 13 | 76 | 93 | 99 | 90 | 90 | 82 | 95 | 90 | 86 | 35 | 98 | 91 | 88 | 95 | 96 | 93 | 14 | 37 | 72 | 37 | 81 | 66 | 66 | 45 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 85 |
| 14 | 47 | 25 | 59 | 33 | 70 | 27 | 80 | 77 | 75 | 65 | 75 | 90 | 30 | 39 | 35 | 26 | 63 | 46 | 46 | 46 | 45 | 45 | 81 | 81 | 94 | 94 | 94 | 94 | 97 | 85 | 93 | 93 |
| 15 | 66 | 85 | 85 | 74 | 86 | 92 | 80 | 27 | 97 | 99 | 96 | 82 | 60 | 86 | 83 | 65 | 19 | 54 | 46 | 54 | 93 | 81 | 66 | 45 | 94 | 94 | 94 | 94 | 97 | 93 | 97 | 93 |
| 16 | 74 | 54 | 81 | 59 | 90 | 90 | 90 | 90 | 86 | 86 | 82 | 65 | 58 | 35 | 50 | 39 | 26 | 72 | 72 | 85 | 98 | 97 | 97 | 93 | 94 | 94 | 94 | 94 | 85 | 85 | 85 | 85 |
| 17 | 81 | 70 | 59 | 88 | 99 | 96 | 64 | 70 | 93 | 97 | 82 | 97 | 50 | 55 | 35 | 44 | 46 | 19 | 26 | 37 | 45 | 45 | 27 | 27 | 94 | 94 | 94 | 94 | 97 | 93 | 93 | 85 |

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TABLE 35 CONTINUED

| Subject No. | AX | | | | HS | | | | BR | | | | PN | | | | B | | | | P | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1 | 35 | 20 | 05 | 10 | 65 | 82 | 36 | 45 | 96 | 37 | 71 | 94 | 88 | 50 | 94 | 67 | 67 | 67 | 67 | 67 | 77 | 10 | 15 | 90 |
| 2 | 78 | 57 | 71 | 89 | 93 | 99 | 99 | 99 | 99 | 98 | 99 | 96 | 67 | 99 | 99 | 97 | 96 | 67 | 88 | 67 | 77 | 98 | 98 | 98 |
| 3 | 52 | 34 | 48 | 78 | 97 | 87 | 94 | 91 | 52 | 66 | 73 | 41 | 35 | 58 | 88 | 88 | 39 | 66 | 82 | 39 | 18 | 01 | 43 | 12 |
| 4 | 85 | 85 | 71 | 71 | 99 | 99 | 97 | 88 | 86 | 71 | 91 | 91 | 99 | 99 | 99 | 99 | 96 | 67 | 94 | 67 | 23 | 49 | 36 | 84 |
| 5 | 42 | 10 | 20 | 10 | 90 | 65 | 56 | 56 | 80 | 91 | 91 | 71 | 88 | 88 | 88 | 50 | 84 | 67 | 88 | 67 | 95 | 84 | 77 | 77 |
| 6 | 82 | 92 | 26 | 92 | 88 | 88 | 27 | 86 | 98 | 97 | 63 | 98 | 99 | 88 | 29 | 81 | 96 | 67 | 67 | 67 | 90 | 66 | 05 | 98 |
| 7 | 05 | 20 | 35 | 05 | 19 | 65 | 82 | 56 | 63 | 80 | 86 | 63 | 50 | 81 | 97 | 94 | 96 | 96 | 88 | 88 | 49 | 49 | 49 | 49 |
| 8 | 26 | 10 | 05 | 05 | 56 | 12 | 12 | 36 | 86 | 80 | 49 | 86 | 81 | 88 | 97 | 81 | 88 | 88 | 94 | 88 | 98 | 95 | 95 | 84 |
| 9 | 10 | 78 | 57 | 42 | 19 | 78 | 82 | 65 | 71 | 86 | 49 | 49 | 29 | 88 | 67 | 88 | 67 | 67 | 67 | 67 | 77 | 36 | 36 | 77 |
| 10 | 20 | 05 | 10 | 20 | 86 | 36 | 45 | 12 | 49 | 17 | 06 | 06 | 50 | 97 | 94 | 94 | 88 | 88 | 88 | 67 | 77 | 90 | 36 | 23 |
| 11 | 14 | 34 | 55 | 68 | 05 | 11 | 11 | 05 | 41 | 33 | 33 | 33 | 25 | 35 | 02 | 02 | 99 | 99 | 99 | 99 | 18 | 18 | 31 | 43 |
| 12 | 35 | 35 | 42 | 26 | 88 | 90 | 82 | 56 | 71 | 49 | 63 | 06 | 99 | 99 | 99 | 50 | 88 | 94 | 88 | 94 | 05 | 15 | 05 | 02 |
| 13 | 26 | 66 | 71 | 57 | 78 | 88 | 90 | 88 | 49 | 71 | 86 | 86 | 81 | 99 | 50 | 81 | 67 | 94 | 94 | 67 | 66 | 95 | 95 | 95 |
| 14 | 35 | 10 | 35 | 26 | 56 | 86 | 65 | 56 | 27 | 71 | 63 | 49 | 81 | 88 | 67 | 67 | 88 | 67 | 67 | 88 | 36 | 36 | 15 | 77 |
| 15 | 78 | 57 | 71 | 57 | 78 | 88 | 82 | 82 | 97 | 94 | 91 | 86 | 67 | 88 | 50 | 67 | 96 | 88 | 88 | 94 | 84 | 84 | 95 | 36 |
| 16 | 20 | 35 | 35 | 66 | 78 | 94 | 86 | 78 | 63 | 80 | 96 | 71 | 97 | 99 | 94 | 88 | 88 | 88 | 94 | 96 | 23 | 36 | 66 | 49 |
| 17 | 42 | 35 | 26 | 35 | 65 | 82 | 65 | 72 | 91 | 91 | 71 | 63 | 81 | 81 | 98 | 94 | 98 | 88 | 88 | 86 | 36 | 66 | 49 | 84 |

## TABLE 36

## HOLTZMAN INKBLOT TECHNIQUE DATA

### DIFFERENCE PERCENTILE SCORES (BEFORE THERAPY MINUS AFTER THERAPY)* ON VARIABLES OF THE EPPS

| Subject No. | RT | R | L | S | FD | FA | C | SH | M | V | I | H | A | AT | SX | AB | AX | HS | BR | PN | B | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -18 | 00 | +08 | 00 | +07 | -30 | -07 | -04 | 00 | -27 | -01 | +05 | 00 | 00 | 00 | 00 | +15 | +46 | -34 | -44 | 00 | -05 |
| 2 | +26 | 00 | +04 | 00 | -01 | -39 | -52 | -17 | 00 | +02 | 00 | +01 | -01 | +18 | 00 | -08 | -14 | 00 | -01 | 00 | -21 | 00 |
| 3 | +01 | 00 | +17 | 00 | +21 | +01 | -10 | +16 | +07 | -03 | +02 | +03 | +47 | -13 | 00 | +13 | -14 | -07 | -07 | -30 | -16 | -42 |
| 4 | +10 | 00 | -05 | 00 | +07 | +25 | +17 | -03 | +53 | -06 | -09 | 00 | -11 | +02 | 00 | 00 | -14 | +02 | -20 | 00 | -27 | +13 |
| 5 | +41 | 00 | +27 | 00 | +13 | +45 | +06 | +04 | +28 | 00 | -06 | +06 | 00 | 00 | 00 | +08 | -10 | +09 | 00 | 00 | -21 | +07 |
| 6 | -04 | 00 | +16 | 00 | 00 | +85 | -23 | 00 | +01 | -63 | -07 | -07 | +09 | -18 | 00 | +01 | +66 | +61 | +34 | +59 | 00 | +61 |
| 7 | -12 | +19 | 00 | -43 | 00 | -08 | 00 | +10 | 00 | 00 | -02 | +24 | 00 | 00 | 00 | 00 | -15 | -17 | -06 | -16 | +08 | 00 |
| 8 | +12 | +10 | 00 | 00 | +13 | +39 | -02 | 00 | +07 | 00 | +02 | 00 | +28 | -15 | 00 | 00 | +05 | 00 | +31 | -09 | -06 | 00 |
| 9 | 00 | -13 | +16 | 00 | +40 | +18 | +11 | +10 | +48 | -43 | +61 | +32 | +07 | +18 | 00 | 00 | +21 | -04 | +37 | +21 | 00 | 00 |
| 10 | -14 | 00 | +01 | +33 | -05 | +09 | +03 | -01 | +20 | +10 | +11 | 00 | -02 | 00 | 00 | 00 | -05 | -09 | +11 | +03 | 00 | +54 |
| 11 | +16 | 00 | +10 | 00 | -09 | -05 | +41 | +17 | -12 | +08 | -25 | 00 | -03 | -01 | 00 | +13 | -21 | 00 | 00 | +33 | 00 | -13 |
| 12 | +29 | 00 | -09 | 00 | +13 | -06 | 00 | 00 | +09 | +53 | +24 | +10 | +07 | +18 | 00 | 00 | -07 | +08 | -14 | 00 | +06 | +10 |
| 13 | +09 | 00 | +05 | 00 | -15 | +02 | +18 | +13 | -06 | -13 | -63 | -01 | -35 | 00 | 00 | 00 | -05 | -02 | -15 | +49 | 00 | 00 |
| 14 | +23 | 00 | -05 | 00 | -25 | -22 | +07 | +19 | -34 | -53 | -10 | +04 | 00 | -36 | 00 | -08 | -25 | +21 | +08 | +21 | 00 | +21 |
| 15 | +16 | 00 | +08 | 00 | -05 | -08 | -07 | +13 | 00 | +12 | +03 | +93 | +08 | +15 | 00 | -04 | -14 | +06 | +03 | +38 | 00 | -11 |
| 16 | +08 | +26 | 00 | 00 | -22 | +10 | -11 | -09 | +27 | 00 | +04 | -15 | 00 | 00 | 00 | 00 | 00 | +08 | -16 | +05 | -06 | -30 |
| 17 | +02 | +02 | -04 | 00 | -09 | +67 | -15 | -36 | +11 | +32 | +15 | +20 | -07 | +18 | 00 | 00 | +09 | +17 | +20 | -17 | 00 | +17 |

* a plus score indicates a lower percentile score after therapy

# TABLE 37

## PALMAR SWEAT DATA

| Subject No. | Test Period 1 | | | | | Test Period 2 | | | | | Test Period 3 | | | | | Test Period 4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | condition | | | | | condition | | | | | condition | | | | | condition | | | | |
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 1 | 6.6 | 3.3 | 4.8 | 15.0 | 3.1 | .7 | .8 | 7.0 | 2.1 | 2.3 | .6 | 3.1 | 43.0 | 30.0 | .1 | 24.0 | 27.0 | 30.0 | 45.0 | 1.5 |
| 2 | 11.0 | 4.1 | 17.0 | 1.1 | 4.8 | 5.6 | 31.0 | 14.0 | 40.0 | .8 | 8.0 | 2.1 | 5.5 | .8 | 2.2 | 3.0 | 2.9 | 7.9 | .5 | .5 |
| 3 | .5 | .3 | .5 | .6 | .3 | .5 | .5 | 25.0 | 3.8 | .7 | .1 | .2 | 2.4 | .2 | .3 | .3 | 1.0 | 3.7 | .8 | 1.0 |
| 4 | 2.8 | 9.0 | 8.9 | 5.9 | 7.6 | 52.0 | 3.3 | 5.6 | 60.0 | 90.0 | 4.0 | 1.5 | 3.9 | 3.6 | .4 | 94.0 | 7.4 | 60.0 | 19.0 | 3.2 |
| 5 | .6 | .3 | 12.0 | .4 | 1.2 | .2 | .4 | .9 | .5 | .3 | .4 | .4 | 1.4 | .4 | .3 | 8.2 | .6 | 2.0 | 5.3 | 1.0 |
| 6 | 22.0 | 8.0 | 30.0 | 18.0 | 23.0 | 4.8 | 9.0 | 22.0 | 11.0 | 6.9 | 19.0 | 5.7 | 7.7 | 19.0 | 8.2 | 15.0 | 6.8 | 5.9 | 3.3 | 13.0 |
| 7 | .6 | 2.1 | 32.0 | 1.3 | 4.8 | 3.5 | 2.0 | 5.6 | 4.0 | 1.2 | 4.6 | 4.6 | 9.4 | 3.9 | 2.0 | 2.2 | 3.0 | 2.8 | .8 | 2.9 |
| 8 | 8.9 | .5 | 21.0 | 20.0 | 2.2 | .6 | .6 | .6 | .4 | .3 | .6 | .2 | 5.0 | .9 | .2 | .3 | .4 | 1.9 | .9 | .5 |
| 9 | .4 | .7 | 6.2 | .1 | 1.1 | .1 | .3 | .6 | .2 | .2 | .9 | .6 | .3 | .3 | .6 | .4 | .9 | 2.7 | 1.2 | 1.3 |
| 10 | 6.6 | 16.0 | 50.0 | 8.0 | .2 | 2.9 | 8.8 | 11.0 | 36.0 | 5.4 | 27.0 | 28.0 | 32.0 | 73.0 | 2.8 | 14.0 | 29.0 | 70.0 | 89.0 | 9.0 |
| 11 | .3 | 5.0 | 11.0 | .8 | 12.0 | .2 | .4 | 3.2 | 1.2 | .4 | 2.0 | .3 | 20.0 | 15.0 | .3 | .4 | .4 | 1.5 | 4.0 | 1.8 |
| 12 | 79.0 | 95.0 | 99.9 | 86.0 | 80.0 | 20.0 | .3 | 7.3 | .4 | 5.2 | 11.0 | 7.0 | 16.0 | 12.0 | 10.0 | 36.7 | 34.1 | 41.1 | 32.8 | 31.7 |
| 13 | 2.3 | 6.6 | 84.0 | 5.5 | 10.0 | 4.2 | .3 | 7.6 | 2.4 | .2 | 1.1 | 1.1 | 18.0 | 1.6 | .4 | 2.0 | 9.0 | 6.9 | 10.0 | 20.0 |
| 14 | 26.0 | 40.0 | 99.9 | 99.9 | 27.0 | 37.0 | 32.0 | 78.0 | 15.0 | 5.0 | 12.0 | 5.4 | 12.0 | 44.0 | 15.0 | .3 | 74.0 | 99.9 | 92.0 | 11.0 |
| 15 | 1.7 | .9 | 13.0 | 2.0 | .5 | .2 | .5 | 10.0 | .3 | .1 | .3 | .4 | .3 | .3 | .3 | .2 | 1.8 | 1.6 | 8.4 | .7 |
| 16 | 1.2 | 2.5 | 57.0 | 39.0 | .6 | 2.6 | .6 | 27.0 | 7.6 | 1.4 | 7.1 | 9.0 | .3 | 7.8 | 3.6 | 5.8 | 1.7 | 15.0 | 1.9 | 4.5 |
| 17 | .3 | .2 | 8.6 | .6 | .1 | .9 | .9 | 4.5 | 3.8 | 2.2 | 1.2 | 8.4 | 10.0 | 2.2 | .9 | .5 | .3 | .5 | 2.2 | .4 |

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